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VII. 4 a

# TRANSACTIONS

OF THE

# MEDICAL AND PHYSICAL SOCIETY

OF

# BOMBAY.

No. V. NEW SERIES.

FOR THE YEAR 1859.

Bombay:
PRINTED AT THE
EDUCATION SOCIETY'S PRESS, BYCULLA.
1860.

No. 4 of 1860.—

# MEDICAL AND PHYSICAL SOCIETY OF BOMBAY.

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Sir,

*I am directed by the Committee of the Medical and Physical Society to forward the* 5th *Number of a New Series of its Transactions for* 1857.—

*I have the honour to remain,*

*Sir,*

*Your obedient Servant,*

Bombay,
1st March 1860.

W. C. Coley

*Secretary.*

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OF THE

# MEDICAL AND PHYSICAL SOCIETY

OF

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# ANNUAL REPORT OF THE 25TH REGIMENT N. I.

## *For the Year* 1857-58.

BY ASSISTANT SURGEON W. J. STUART.

Presented by the Director General, Medical Department.

On the 1st April 1857 there remained in hospital 11 cases, and up to the 31st March 1858 the number of admissions have been 785; the total number treated during the year being, therefore, 796. Twenty-four men have died; but as 14 deaths occurred from cholera, acquired on the line of march, and 6 were fatal cases from gun-shot wounds, received in action, only 4 deaths have occurred from ordinary diseases. Considering that the regiment has been almost constantly on active service in the field, since the 1st April 1857, and that after a tour of duty in Guzerat of more than three years, the following comparison of the proportional daily sick with that of the previous year gives a very favourable aspect of the health of the regiment:—

| | 1856-57. | 1857-58. |
|---|---|---|
| Average daily sick..... | 35·02 | 19·5 |
| Proportion of sick to strength .... | 114·0 | 104·0 |

This favourable result has been influenced by a large number of young and healthy recruits having joined the regiment; most of the old and worn-out men having been left with the Depôts, first at Ahmedabad, then at Poona, and eventually at Mhow. The average strength of the regiment on service has been 753; the number invalided from those left with the Depôt, as worn-out from age and disease, has been 24.

The regiment on 1st April 1857, was under canvas at Domus, preparatory to embarkation for Persia. At this time the sepoys generally presented a very cachectic aspect, and many showed the usual signs of scurvy—as loss of teeth; spongy, livid gums, bleeding on pressure; pains in the limbs, &c. The embarkation took place on the 4th April: but, after being at sea four days, the regiment was recalled, and, disembarking at Bombay, proceeded to

Poona, which we reached about the 19th of April. The change of climate from the enervating heats of Guzerat to the more stimulating climate of the Deccan, had a marked good effect upon the men: they improved in appearance, and lost the worn, cachectic look, which was so marked on leaving Ahmedabad; whilst the common diseases for which they were admitted assumed a sthenic type.

The regiment remained at Poona but a short time; and on the 8th of June we marched for Central India, to assist in suppressing the insurrection. On the march to Ahmednuggur, the men were exposed to very inclement weather—heavy rain, with a burning sun at midday—and they fell out by scores. After a short stay at Ahmednuggur we proceeded to Aurungabad, where we remained some weeks, and then pushed on for Mhow; marching, on an average, 15 miles a day, without intermission, over execrable roads, until we reached Asseerghur, with only two halts afterwards to enable us to cross the rivers. On the 20th July, about midway to Asseerghur, cholera made its appearance, first in the person of the Commanding Officer, then of three Sepoys, all of whom died in a few hours. It appeared to have been caused by our passing through the town of Bodur, where it was very prevalent and fatal, as only those portions of the force which entered the town were affected; those who passed outside remained free from the disease. Twenty-eight cases occurred before we reached Mhow (August 3rd); 12 died, and 16 recovered: the last case was admitted two days after arrival at Mhow, and proved fatal. There cannot be a doubt that the disease was kept up by the exhaustion produced by incessant marching, by encamping on black soil, by the heavy duties (in fatigue parties, to help the baggage over bad roads and rivers), and by the men being often two days without food. The regiment remained at Mhow till the 18th October. This rest, and good quarters, had a very beneficial effect on the general health of the men; for notwithstanding the constant heavy rain (57 inches in six weeks), and constant exposure, from the necessity for large picquets, the admissions were proportionately few, and chiefly mild cases of intermittent fever, and an occasional case of diarrhœa and dysentery; but about the 24th of September, two cases of cholera were admitted, and both proved fatal.

On the 18th of October the regiment left the Mhow cantonments, and entered on the campaign which led to the capture of the Fort of Dhar, and the fights near Mundesoor. During the siege of Dhar, the men were constantly on duty for 10 days; but it is remarkable that not an admission into hospital took place, except for slight contusions. The men were also very healthy during the long march to Mundesoor, which we reached on the 21st November. In the actions of the 23rd and 24th the regiment suffered severely, having 4 officers and 28 men wounded, and 6 men killed by gun-shot wounds. One shot through the heart, died instantly; one through the head in about an hour: and four penetrating wounds of the abdomen proved fatal, from rapid effusion into, and inflammation of, the peritoneum; one afforded a chance of recovery, but the necessity of moving the force produced a relapse, and death rapidly ensued.

After remaining a few days at Mundesoor, the regiment returned to Indore, which we reached on the 15th December, after a most toilsome march over very bad roads, crossing several rivers with stony beds, rendering the harassing duty of fatigue parties necessary. The men now exhibited a jaded appearance, and the signs of scurvy were prevalent. On, inspecting the regiment, for the purpose of leaving the weakly behind at Mhow (as an immediate advance towards the Jumna was expected), upwards of 106 were found unfit for further marching; but as the brigade to which the regiment belonged was ordered to Mhow to refit, it remained there till the 8th February; and by that time a marked improvement had taken place, so that only 44 sick and weakly men remained behind. The regiment, strengthened by nearly 200 recruits, reached Jhansi on the 23rd March, after having assisted in the siege and capture of the Fort of Chundairee, where only two slight wounds occurred among our men. Before Jhansi most onerous and dangerous duties were performed; and the regiment assisted in the total rout of an immense force of the enemy at the battle of the Baitwa, and in the escalade and storming of the fortified city of Jhansi, in which the casualties were very heavy. This will, however, form the subject of another year's report, having occurred after the 1st April 1858.

From this sketch, during the past year, it will be seen that the regiment has been on active field service for 7 months, exposed alike to the inclemency of the monsoon, to the heats of October, and to a hot season under canvas. Irrespective of being engaged in two sieges—in the storm and capture of a large village and fortified city—and in two actions with the enemy in the field, the duties devolving on the regiment have been extremely harassing; that often the men were on duty two and three days in succession, thus preventing their meals being taken with regularity, added to which the food was often bad and scanty. Notwithstanding all this, however, the excitement of war, and the constant marches, seemed to ward off the appearance of severe disease; but a cachectic condition of the system was produced, and the men became easily prone to the deleterious effects of malaria. The following is a short sketch of the most prevalent diseases, with a summary of the treatment employed:—

*Fevers.*—Under this head 232 cases have been admitted, 3 have died, and 6 remained under treatment on 31st March. The first fatal case occurred in a man of cachectic habit. The fever commenced as quotidian, from which he was recovering, when, on reaching the high lands of the Deccan, the cold nights under canvas brought on thoracic complication, and he sank rapidly. The second instance was a worn-out old man, who had been left with the Depôt at Ahmedabad. On the march to Poona, during the month of May, an attack of remittent fever rapidly prostrated him: when he arrived in hospital at Poona he was moribund, and died in a few hours. The third death occurred in December at Indore, complicated with pneumonia, brought on by exposure to the cold nights under canvas. The proportion of admissions from fever have been greatest while marching; thus in April they were 30 in number, in June 37, in July 40, in October 26, November 21; while in May, stationed at Poona, only 18; in August and September, at Mhow, 29 and 19; and in January, at Mhow, 15. Of the intermittent type 194, remittent 17, ephemeral 20, and continued (only) 1, have been admitted.

The treatment of the intermittent type has consisted in administering quinine in four-grain doses, at short intervals, before the expected febrile paroxysm. In the remittent form quinine was

frequently repeated, in doses of 10 or 15 grains, during the remission, with the view of prolonging it, and thus rendering the case comparatively of a mild nature. Emetics and purgatives were seldom necessary, and antimonials produced too much depression. A combination of ipecacuanha, opium, and calomel with the quinine, has proved successful in thoracic complications. The tincture of berberine has been extensively tried, and proved utterly useless.

*Diseases of the Bowels.*—23 cases of dysentery have been admitted, and all discharged well;—a small number, considering the fatigue the men have undergone, often with bad food and water. The treatment I have found most efficacious has been ipecacuanha, in doses of three grains, with a small quantity of opium, and pil. hydrarg., but in addition three grains of quinine; as I believe in the majority of instances malaria is the exciting cause of this malady. Of diarrhœa, 47 cases were admitted; one remaining under treatment. The majority of these occurred during the visitation of cholera in July and August, assuming at that period the serous type. At other periods the disease has been of a mild form, in which the common astringent remedies, followed by a mild laxative, soon produced a cure: in the serous type acetate of lead combined with opium was found useful. At Poona, a recruit was brought into hospital in a state of extreme collapse from watery purging, which had been going on for eight hours. He never rallied; and, as there was no epidemic cholera present in the station, the case was entered in the register as "cholera morbus."

*Contusions.*—Under this head no less than 147 cases have been admitted, chiefly from badly-fitting shoes, causing abrasions and ulcers most difficult to heal. English-made shoes are unfit, in my opinion, for sepoys; and the substitution of a strong shoe made like the native slipper would add much to the general efficiency of the men.

*Epidemic Cholera.*—This fearful malady commenced without any premonitory signs on the 20th July 1857, between Aurungabad and Mhow. It has been already remarked that it appeared only in those portions of the brigade which marched through the town of Bodur,—a place with narrow, winding, and extremely

dirty streets, in which it was afterwards ascertained the disease was raging. Cholera clung to the regiment during the rest of the march. Every precaution was taken to prevent it spreading: those affected were kept in a separate tent; were allowed separate carriage; and the clothes of those who died were burned. Two or three days would elapse sometimes without an admission, and then three or four cases appeared in one day, generally when the men had made a longer march, or had been exposed to greater fatigue, than usual. The disease entirely disappeared on reaching Mhow, although the convalescents were in hospital for a long period. In almost every instance the state of extreme collapse rapidly came on; for which I felt unable to assign any demonstrable cause, as the alvine evacuations, although copious, and of the usual rice-water type, were not frequent, the spasms were not severe, nor was there much vomiting; but so rapid was the collapse, that I only observed the premonitory stage in two instances out of 30 cases admitted. The weather was extremely oppressive; there was much electric disturbance: heavy masses of cloud ushered in the monsoon, but no rain fell, till three days before we reached Mhow. The roads were bad, and marching most fatiguing. The encamping grounds were generally on black soil, or in its immediate neighbourhood, or the ground was covered with low jungle. The drinking water was often very bad, and the men had their meals, as has been before remarked, in a most irregular manner.

It is singular that during the period cholera prevailed, not a case of fever was admitted.

The treatment at first employed was to administer diluted sulphuric acid, with opium, to arrest the vomiting and purging, and afterwards brandy and ammonia as required. Every means of increasing the general warmth of the body was also employed. In three cases, I tried (on the urgent recommendation of a medical officer of the force) sulphur and soda, but without any beneficial results. In later cases I trusted much to the early use of acetate of lead in 2-grain doses, combined with 1 grain of opium, every half-hour, until the sickness and purging were arrested—and I never found it fail in producing this effect in three, or at most four doses—followed by the use of stimulants as before described.

Enemata, containing acetate of lead and opium, were also employed with advantage. Although 16 cases only eventually recovered, yet, I believe, several more would have been saved, but for the necessity of constantly marching, when several, who had rallied during the day, sank from the fatigue of the march. The convalescence of those who recovered was long, and characterised by general anasarca.

*Gun-shot wounds.*—In the action fought near Mundesoor on the 23rd and 24th November 1857, 26 cases of gun-shot wounds were admitted into hospital, mostly very severe, arising from the men being shot when close to the muzzle of the enemy's guns from behind walls, within small enclosures, and even within rooms. There were four penetrating wounds of the abdomen: in one the ball entered at the right side, and made its exit through the left ilium, brought on rapid effusion into the peritoneal cavity, and death in three hours. In another instance the ball entered just below the right nipple, and passed through the diaphragm and liver, into the abdominal cavity; death occurred in 24 hours. In another case the ball entered just above the crista ilii on the right side, and passed directly into the cavity of the pelvis; death occurred in 24 hours. In the fourth instance the ball, having passed through the right arm, entered the abdomen just below the right false ribs; the man survived three days, and would probably have recovered, but for the necessity of moving the force two days after the fight. In all these cases, the free application of leeches, hot fomentations, and the administration of opium in full doses of two and three grains every second or third hour, with the occasional addition of a third of a grain of antimon. potass. tart., was the treatment adopted. In only the fourth case was there a chance of recovery. Unfortunately, owing to native prejudices, no *post mortem* was obtained. The fifth fatal case was caused by a ball passing directly through the head; he died an hour after admission. Eventually a sixth case proved fatal. In this instance the ball entered at the centre of the left instep, and passed out behind the outer malleolus; an attempt was made to save the limb, under the impression that the joint was uninjured. Extensive sloughing of all the soft tissues, however, ensued, and amputation was eventually necessary. Although under disad-

vantageous circumstances, I removed the leg below the knee on the 9th December, but the stump soon became gangrenous, and he died on the 13th. It was found, on examination, that the ball had not entered the joint, but had passed directly through the head of the tibia, fracturing it in a starred manner, into the joint.

All the other cases did remarkably well. In one instance the left knee was crushed by a round-shot, the ball first striking the outer side of the thigh, and tearing up the soft tissues in its course. Amputation just below the trochanter major was performed on the field. This case is now well, with a good, though short stump.

A successful case of conservative surgery was witnessed. A musket ball struck a young sepoy about the centre of the left tibia, splintering it upwards and downwards; the ball was removed, but the man having endeavoured to walk after the injury, the fibula gave way; a side splint was applied, and the limb carefully retained in a fixed position. Extensive suppuration up to, and even around, the knee-joint, rendered it necessary, on the 12th day after the injury, to make a free longitudinal incision, when a large splint of bone was discovered protruding backwards, and removed. This case has done remarkably well; and when I left it at Mhow, on the 8th February, he had commenced moving about on crutches, with the limb shortened not more than three-quarters of an inch. In another instance a ball entered the right eye, to its inner side, and totally destroyed that organ. It then passed downwards to the right through the posterior nares and the antrum of Highmore, and emerged just at the inferior margin of the right malar bone, which it fractured in a starred manner. The man was left at Mhow convalescent. In another case, the ball entered just below the second rib on the left side, passed directly through the chest, through the scapula near its inferior angle, and was removed from under the integument. It became necessary to extract some spiculæ of bone, and a small portion of his coat from the bottom of a sinus over the scapula, about three weeks after the injury. This case was also left convalescent. In two instances, musket balls passed directly through the thigh (in one through its upper, in the other its middle third), without injuring the large vessels or nerves. In

one instance a ball entered directly in front of the right shoulder joint, passed round the head of the humerus (wounding a large arterial branch), and was removed from just above the spine of the scapula. In two cases balls passed round the elbow joint, without doing much injury.

Throughout the campaign it has been noticed, that injuries of the abdominal cavity generally proved fatal, whilst patients recovered from those of the thoracic.

*Annual Return of Sick of the 25th Regiment N. I., for the Year* 1857-58.

STRENGTH—796. *Jhansi, 1st April* 1858.

| | Treated. | Died. |
|---|---|---|
| Fevers | 238 | 3 |
| Eruptive Fevers | 8 | .. |
| Diseases of the Lungs | 13 | .. |
| Diseases of the Stomach and Bowels | 97 | 1 |
| Epidemic Cholera | 30 | 14 |
| Diseases of the Brain | 10 | .. |
| Rheumatic affections | 43 | .. |
| Venereal affections | 41 | .. |
| Abscesses and Ulcers | 77 | .. |
| Wounds and Injuries | 191 | 6 |
| Diseases of Eye | 8 | .. |
| Do. of the Skin | 7 | .. |
| Other Diseases | 33 | .. |
| Total | 796 | 24 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 104·3 |
| Ditto of deaths to ditto | 3·1 |
| Ditto of do. to treated | 3·0 |
| Daily average number of sick | 19·5 |

# ANNUAL REPORT OF THE 25TH REGIMENT N. L. I.

## *For the Year* 1858-59.

BY SURGEON W. J. STUART.

Presented by the Director General, Medical Department.

Having already given the medical history of the 25th Regiment N. L. I. during the campaign in Malwa in 1857, and the commencement of that in Central India, including the siege and capture of Chundairee, and arrival before the walls of Jhansi, to the end of March 1858, it is now my duty to sketch the proceedings of the regiment from the 1st April 1858 to the 31st March 1859, during which period it has been present in all the eventful actions of the campaign in Central India, from the storming and capture of Jhansi, to the concluding triumph at Gwalior on the 20th June 1858. Stationed in cantonments at Gwalior till the 16th February 1859, the regiment furnished strong detachments to form part of numerous flying columns constantly pursuing or engaged with the enemy in the territories of Scindiah. On that date it commenced its march for the Bombay Presidency, which it performed in the usual manner to Goonah, thence to Wassind by bullock train, and thence to Poona by railway, arriving at Poona about the 29th March 1859; having thus been absent on field service one year and ten months, constantly marching or engaged in active operations against the enemy.

Before tracing the history of the regiment more minutely, I must draw attention to the amount of sickness and mortality which has occurred during the year. On the 1st April 1858 there remained in hospital 26 cases; to the 31st March 1859 the total number of admissions have been 544; the total number treated being therefore 570. Of these, 13 have died in hospital; 9 of which were the result of injuries received in action with the enemy, 1 from sloughing carbuncle, 1 from the sloughing phaga-

denic form of syphilis, 1 from cholera, and 1 (an officer) from diarrhœa consequent on general mesenteric disease. 8 cases remained under treatment on the 1st April 1859, giving a total of 549 discharged.

The average daily number of sick has thus been only 17·7; the proportion of sick to strength 95·6, of deaths to treated 2·2, of deaths to strength 2·1; the average strength of the regiment at head quarters having been 596·5. Favourably as these numbers speak for the health of the regiment during the past year, it would have been still better could the returns of the various detachments removed from head quarters have been included. But while I thus draw attention to the pleasing side of the picture, I am compelled to show a reverse, viz. that 80 native officers and men have been invalided; in the majority of instances worn out with diseases, the effect of hard work and exposure; in some the result of wounds received in action; and in a few simply from old age, and time-served.

One reason also why the amount of sickness and mortality has been so small is, that previous to the regiment leaving Jhansi for a renewal of active service, and exposure to constant marching and the intense heats of Central India (from which most injurious results were naturally expected), all the weakly and infirm were carefully selected from the ranks, and with the sick and wounded left in the Fortress, where they remained until all active operations were concluded, joining the regiment at Gwalior; thus only the young men, and those who were in good health, were exposed to the causes certain to be productive of disease.

I now purpose tracing the general history of the regiment from month to month, and afterwards to give a more particular account of the nature and treatment of those diseases which have prevailed during the year, concluding with a short account of the wounds received in action.

In my report of 1857-58, I stated how much the scorbutic condition of the men affected the type of disease, and retarded the healing of all injuries; this state was brought very prominently to notice after the storming of Jhansi, in April 1858. The general aspect of the older sepoys was that of extreme exhaus-

tion, for which the march from Mhow, and the duties they had been employed on, were not sufficient causes; it was that of extreme cachexia, the features sunk, a feeling of despondency, inducing many of the best sepoys to express their inability for further service; their teeth were loose, gums of a blue livid hue, bleeding on the slightest pressure, no appetite, and a tendency to diarrhœa exhibited. The result was, that all the wounds took on a very unhealthy action: sword-cuts which, under ordinary circumstances, would have healed by the first intention, about the third day began to exude a foul ichorous discharge; the margins became swollen, with inflamed borders; then exuberant granulations formed, covered with a dirty yellow discharge, which was not removeable; and at last the whole would assume the appearance of a large malignant fungoid mass, which required constant watching and great attention to cleanliness to prevent the formation of maggots in its mass. The effluvia from these wounds became most offensive, and medical officers on visiting the hospital remarked that, had they been ignorant of the patient having been wounded, they should have deemed the case one of malignant fungus; an examination of the mouth revealed the cause. Again, this condition of health caused every injury to the surface of the body, as a slight contusion, pressure from a tight shoe, or other cause, to assume the same unhealthy ulcerative action. Abscesses, too, were of frequent occurrence; and even old ulcers, healed years before, broke out afresh, without any apparent cause. Gun-shot wounds, which were most numerous, assumed the same unhealthy type. The diet of the sepoy is, unfortunately, of a nature to aggravate the above state; we have thus presented the disease of deprivation, of low diet, and of impure oxygenation of the blood, the latter aggravated by the crowded state of our hospitals. The defect of vitality caused by these influences was manifested by a weak pulse and cold extremities, and exhibited itself in the formation of the morbid deposit and morbid action above named. I shall briefly in this place state that rest, large hospital rooms, with as pure air as possible (difficult to obtain in a crowded fortress, and in native houses, to which the sick and wounded had to be removed on the march of the army), extreme

cleanliness, the application of stimulants to the morbid surfaces while the most soothing applications were applied over all, as generous a diet as possible, with the free exhibition of opium, ammonia, and bark formed the general plan of treatment.

April. On the 1st of April the Battle of the Betwa was fought; the men were exposed to great heat, without food, during two successive days, and severe marching. The officer commanding and some men were completely prostrated by the intense heat; these were the first cases which came under my notice of the depressing influence of exposure to the sun. On the morning of the 3rd April, the city of Jhansi was taken by storm and escalade.

In the above operations, while manning the batteries during the siege, or in minor contests with the enemy, the following casualties occurred:—Killed 6, wounded mortally 3 (died in hospital), dangerously 4 (one died), severely 8 (one died), slightly 14.

Of these, there were gun-shot wounds 33, sword-cuts 1, burnt by explosion 1.

During this month the weather became very hot at midday, its effects much heightened by the dry, white, sandy character of the soil and surrounding country; the general level relieved only by the rocky hills on which the fort was built, and in its immediate neighbourhood, or by the muddy beds of large jheels or tanks. The city is large, built close up to the fortress, with narrow streets, enclosed within a strong fortified wall; having in its immediate neighbourhood, to the east and south, large tanks and gardens, to the west and north the arid plain. The nights were cool and refreshing, the direction of the wind north-westerly; in the shade of a hospital tent the thermometer showed maximum 110°, medium 88°, minimum 66°.

The prevailing diseases were a mild form of intermittent fever, and a few cases of diarrhœa and dysentery. Immediately after the fortress of Jhansi was captured, the greater portion of the regiment moved into it as a garrison; the men improved much by the shelter thus afforded, the rest, and an ample supply of provisions. Towards the end of the month, orders were received for it to

accompany the army towards Calpee. I was directed to pick out all weakly, unhealthy men, who were to remain with the sick and wounded; thus of the former above 60, and of the latter 44, were left at Jhansi. Small-pox was prevalent in the town, but only one recruit and a bheestie were affected. This immunity was the evident result of the regiment generally being protected either by vaccination or previous small-pox, and, in my opinion, mainly to the absence of families and the numerous camp-followers which accompany a regiment in time of peace. It is the absence of these fertile sources of contagion,—of the material on which every species of *materies morbi* first sows its fertilising germs,—that I ascribe the total exemption of the whole army from any epidemic or contagious diseases. Had cholera, small-pox, or typhoid fever prevailed, further active operations must have been suspended, as the various depressing causes to which the troops were exposed must necessarily have rendered all efforts to arrest their death-dealing progress futile.

The regiment having left Jhansi on the 26th April, proceeded towards Calpee on the bank of the Jumna. Having been halted at Koonch, a part of the regiment was present at the storming of the small fort of Loharee, when one officer and three men were wounded: two of the latter were sent back to Jhansi.

May. The action with the enemy at Koonch took place on the 7th May. On this occasion the troops, having performed a march of 14 miles during the night, were halted for an hour, soon after day-break for refreshment. In the case of natives this never consists of anything better than a little parched gram and water, while Europeans receive spirits and biscuit. Having partaken of this, we marched over an open, sandy plain, exposed to the terrific heat of the sun, with a dry, hot wind, and having been engaged with the enemy the greater part of the day, did not reach our encampment till 8 P. M. It was during this action that the fearful effects of the sun on the human frame, in a state of exhaustion, first exhibited themselves. Following the line of march of H. M.'s 71st Regiment I

witnessed them in eleven cases, in two of H. M.'s 86th, and one of the 14th Dragoons. In my opinion the morning dram had a most pernicious influence; in my own regiment one officer and one sepoy only suffered in the same manner. No casualty occurred in the regiment in this action.

The march was then continued towards Calpee; and on the morning we approached the village of Gulowlee near the Jumna, and about four miles from Calpee, the enemy's cavalry, attacking the baggage guard, sabred 7 of our men, of whom 5 were killed, and 2 dangerously wounded. This was on the 15th May, and from that date to the 23rd, when Calpee was taken, and the enemy fled, the regiment was incessantly engaged; the duty was most harassing, the heat intense, thermometer standing at near 130° in some of the tents, hot and oppressive even at night, food and water scarce, the latter having to be brought about two miles from the river into camp. On the 17th May we had to leave the camp at 11 A. M., march about 8 miles over a sandy plain, with no water except at one well in a village half way;—the bheesties' puckauls and mussucks were soon empty. Ere we reached the position on which the enemy was making a fierce attack, upwards of 250 men, out of a little more than 400, had fallen out; a short rest, stimuli and water restored them, and they gradually rejoined the ranks; similar scenes occurred daily: four officers (of whom I was one) and 8 of the men were admitted into the sick report; one officer had eventually to proceed to England, from the consequent exhaustion. None died. The numbers admitted were few, as the sepoy, rallying speedily from the effects of the sun does not require admission into hospital, as was invariably the case with the Europeans, both officers and men. The character of the surrounding country aided the injurious effects of the sun, a dry sandy plain intersected by deep ravines, within which the struggle with our opponents took place at midday, or in which, or on the elevated ridges commanding them, our picquets were stationed; not a tree or a bush for shelter, and no water but what could be conveyed by the bheesties. The river being near, and the men permitted to enjoy the comfort of bathing when off duty, preserved the health and efficiency of the regiment. In

the various conflicts with the enemy the casualties were as follows:—

Killed 8, wounded mortally 1 (died in hospital), dangerously 3, severely 5, slightly 2: of these, were gun-shot wounds 13, sword-cuts 6.

On the 23rd May the head-quarter wing of the regiment was ordered to form part of the pursuing column which was formed under command of Lieutenant Colonel Robertson. Being too unwell to proceed with it, I remained with the left wing, and rejoined head quarters on the 8th June.

The result of the hardships the men encountered increased the injurious effects of the scurvy taint so prevalent among them; and the wounds assumed the same unhealthy type as already described. As all had to accompany the regiment on its march to Gwalior, serious results were expected; and that such did not happen is due to the excellent arrangements made for the conveyance of sick and wounded in India.

Intermittent and ephemeral fevers, and a few cases of diarrhœa, were the prevailing maladies of the month:—all recovered. The register of the thermometer, as kept in the hospital tent, exhibited the maximum as 119°, medium 101°·5, minimum 82°: the wind north-westerly.

June. The head quarters of the regiment having left Calpee on the 24th May, and left wing on the 2nd June, were re-united on the 8th, on the bank of the Scinde river, and marched with the rest of the force towards Gwalior; being actively engaged with the enemy on the 17th in the attack upon, and occupation of, the military cantonment of Morar. Here one havildar received severe sabre-cuts across the head; and a regimental camp-follower had one foot carried off by a round-shot, the calf of the other leg being also torn away: with slender hopes of a favourable result, the leg (of which the foot was lost) was removed below the knee, and every effort made to save the other; the man sunk of exhaustion on the fifth day after the injury. Having rested in the cantonments during the 18th, on the night of the 19th the force, by a flank march of about 12 miles, joined that under the command of Brigadier Smyth, opposite the heights

to the south-west of the new city and fortress of Gwalior. The 25th regiment was engaged with the enemy nearly the whole of the 20th, when he fled; but part of the regiment remained in camp, and the rest bivouacked in the city. On the morning of the 21st, after forming part of the force drawn up to receive the Maharajah Scindia on his being restored to his throne, the greater part of the regiment proceeded under the command of Lieutenant Colonel Robertson to secure the old city and the fortress, said to have been evacuated. On approaching the entrance of the city, we were informed that a party of the regiment, under Lieutenant Rose, had already taken the fortress, after an obstinate resistance on the part of a small band of fanatics, during which that officer was mortally wounded by a pistol-shot through the base of the liver, and died the following morning. In this and in the previous engagements the loss sustained was:—Killed 1, wounded mortally 1 (Lieutenant Rose died), dangerously 3 (one died), severely 1, slightly 3. The nature of casualties consisted of gun-shot wounds 1, sword-cuts 6, contusions 2.

The regiment was, for some days, much divided, as it occupied the fortress, and furnished guards to the old and new cities of Gwalior. After remaining three days with the wounded in the fortress, in a room over its gateway made into a temporary hospital, I was directed to proceed with them to the hospital appointed for the regiment in the cantonment.

Soon after returning to camp, Brigadier General Sir R. Napier visited the hospital, and I brought to his notice how much the men were suffering from the effects of scurvy, now aggravated by the fatigue and privation they had undergone. He directed that not only the hospital, but the men in the lines, should be amply supplied with fruit and vegetables; by these means, together with good food, comparative rest, an airy hospital, and residing in the lines, the appearance of the men gradually, but steadily, improved, and wounds and ulcers soon took on a healthy action.

Several cases of dracunculus now appeared among some of the finest and most healthy men of the regiment, chiefly about the feet and ancles. As nearly all those who were affected were high-caste men, whose habits rendered frequent ablution necessary, this

circumstance would point to the introduction of the animalculæ by the integument; but as many store and gun lascars (all low-caste men) suffered in larger proportion, as also several Europeans, and the worm was not confined to the lower extremities, it must have been introduced into the system in some other manner. Guinea-worm chiefly appeared in that portion of the force which, from October to the end of December 1857, served in Malwa, where the water chiefly found in tanks was often bad, and the sides of the tank often covered with decomposing vegetable matter.

Mild cases of intermittent and ephemeral fever prevailed during the month of June; a few cases of diarrhœa; and one, which bore all the appearance of epidemic cholera, proved fatal.

[Thermometer maximum 114°, medium 96°, minimum 78°; prevailing winds westerly and south-westerly; heavy rain towards the end of the month.]

July. From the beginning of July 1858 to the 16th February 1859, the head quarters of the regiment were stationed in cantonments at Gwalior, but furnished large detachments to the various flying columns constantly going out after the enemy. One of these detachments, of about 200 men, under the command of Lieutenant Colonel Robertson, left the camp early in August; were under canvas the whole monsoon, until the middle of March; when, being relieved, they followed the rest of the regiment to Poona. Of this portion of the regiment my hospital returns show no record.

The main body of the regiment, chiefly consisting of recruits who joined in January 1858, remained at head quarters, and rapidly improved in health and strength. After the month of July, when the rains had fairly commenced, to the date on which we marched for Poona, but little worthy of notice occurred.

During the month of July, the regiment being then intact, the men, under the beneficial effects of rest, quarters, excellent food, and water, with an ample supply of fruit and vegetable, steadily regained their healthy appearance; the severe symptoms of scurvy disappeared, the wounds and ulcers assumed a healthy aspect,

healing slowly but steadily; but the number of abscesses admitted, and the sloughing of the soft tissues which was attendant on every case of dracunculus, 7 in number, in addition to 5 in the previous month, evinced how much privation with poor diet had impoverished the physical powers of the men. As a general rule, the wounds, whether from the sword or gun-shot, have done well; but numerous instances of contracted limbs are due to the sloughing away of soft tissue caused by the cachectic state I have described. Mild cases of fever and diarrhœa prevailed among the men, all readily yielding to treatment.

[Thermometer maximum 99°, medium 88°, minimum 78°; fall of rain 8 inches 63 cents.; wind south-westerly; weather oppressive.]

August. During August, the regiment continued to improve in health, and showed the same characteristic type of disease as in July, but assuming a more sthenic character; cases of abscess, much fewer in number. A fatal case of diarrhœa in a young officer occurred this month; a disease from which he had suffered ever since his arrival in the country, a year previous. He exhibited all the signs of having been subject to marasmus when young, and a general morbid smallness of conformation with a large cranium justified the opinion. A *post-mortem* examination revealed tubercular deposit throughout the mesenteric glands; the liver pale, without one spot of a healthy structure; its intertitial spaces filled with adhesive lymph of a dirty yellowish white color; all the other thoracic and abdominal organs healthy, but unusually small. At this period diarrhœa was very prevalent in the camp.

[Thermometer maximum 90°, medium 85°, minimum 81°; fall of rain 7 inches 22 cents.; wind south-westerly.]

September. The month of September exhibited little worthy of notice; the admissions chiefly consisted of mild cases of intermittent fever, and a few severe cases of syphilis. One case of the latter proved fatal by hæmorrhage from the bowels; it occurred in a very unhealthy sepoy, in whom scurvy had been unusually severe: the chancre, and a large bubo which gave way immediately after admission, both exhibited the worst form of sloughing phagedæna.

[Thermometer maximum 92°, medium 85°, minimum 78°; fall of rain 9 inches 3 cents.; wind south and south-easterly.]

October. In October the admissions consisted almost entirely of mild cases of intermittent fever, occurring among the recruits.

[Thermometer maximum 88°, medium 76°, minimum 65°; wind westerly; days oppressive, nights very cool.]

November. The month of November exhibited nothing worthy of note as respects the head quarters of the regiment; but the wounded men left at Jhansi in April having rejoined, showed the bad effects of a crowded hospital and an unhealthy atmosphere, in several instances. One case, which commenced at Jhansi with a carbuncular tumour in the ham of the right leg, was admitted with all the flexor muscles of the leg and thigh exposed, excessive and offensive discharge, and the man in a most exhausted state: he died a few days after admission. This was an aggravated instance of the condition which, in manifold cases, commencing with a mere superficial bruise or small boil, or from the wounds received in action, I have attempted to describe.

[Thermometer maximum 83°, medium 70°, minimum 57°; wind north-westerly; atmosphere dry.]

December. During the month of December the Invaliding Committee having struck off upwards of 80 unfits from the strength of the regiment, the admissions were reduced to 18, chiefly cases of ephemeral fever.

[Thermometer maximum 92°, medium 72°, minimum 52°; wind north-westerly.]

Jan. 1859. In January 1859 there were only 9 admissions, of which three were fever cases; the strength at head quarters being 452.

[Thermometer maximum 74°, medium 63°, minimum 53°; wind westerly.]

February. On the 16th February the head quarters of the regiment commenced its march to Poona, much reduced in numbers, by the greater portion of the men from Hindustan having received leave to their homes. The regiment marched to Goonah, about 130 miles, and reached that station

at the end of February. Nothing worthy of note occurred during this month. No register of the thermometer was kept.

March. In March, the regiment left Mhow in detachments by bullock-train to Wassind, and by railway to Poona, where the head quarters with the greater portion of the regiment were assembled by the 29th of March.

In concluding this general history of the regiment, I would observe, that even in conveying troops such a distance as from Central India to Poona, near 600 miles, there cannot be a doubt of the system by bullock train, being most conducive to the preservation of their health and efficiency. During the whole journey not a single case of illness occurred; and when the regiment reached its destination, instead of numerous cases of ulcers of the feet (always most difficult of cure), there was not one. If the present system of country hackeries was improved upon by supplying light covered carts, the comfort of the men would be much increased.

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*Fevers.*—Of this class of diseases 230 cases have come under treatment, and all have been discharged well; of these 45 were classed as ephemeral, 179 as intermittent, and 6 as remittent fever.

Of the total number 2 cases of remittent and 4 of intermittent fever remained in hospital on 1st April 1858; 25 cases of fever were admitted in April, the regiment during that month being at Jhansi, partly under canvas, partly in the fort; 24 cases were admitted in May, during the march to and active operations *en route* and before Calpee; 19 cases admitted in June, during the the march to and operations before Gwalior; 29 cases admitted in July, the regiment then stationed at Gwalior; 17 cases admitted in August; 36 in September; 31 in October; 27 in November; 9 in December; 3 in January; 2 in February (the regiment being on its return to the Presidency), and 2 in March.

The treatment alluded to in my last report I have seen no reason to modify. The cases of ephemeral fever being generally dependent on vitiated secretions or unwholesome diet, an emetic, a purgative, and some simple saline or antacid, have sufficed to effect a speedy cure.

In cases of the intermittent type, when a loaded tongue and præcordial oppression indicated the necessity of unloading the *primæ viæ*, an emetic and purgative have been first administered; but generally to avoid the exhaustion caused by these remedies, I have commenced at once with the disulphate of quinine, giving five grains over night, repeating it early in the morning, then three grains every three hours, till an accession of fever presented itself, when it was discontinued. By this plan of treatment few cases have remained in hospital more than three days. If any hepatic congestion was present, or the biliary secretions were deficient, a third of a grain of calomel with each dose of quinine proved most efficacious. In the few cases of remittent fever which occurred,—having first relieved the *primæ viæ* by a small dose of calomel and James' powder, followed by an aperient,—I have invariably given doses of 10 or 15 grains of quinine during the remission, if possible, succeeded by four-grain doses at short intervals; treating the period of febrile accession with the citrate of potash or the carbonate of soda.

*Diseases of the Bowels.*—Of acute dysentery only 11 cases have been admitted during the year, and all discharged well. This is an unusually small number, and may be ascribed to the men having been under cover throughout the rainy season, which at Gwalior was of short continuance, and the fall very moderate; for although subjected to great hardship and fatigue, the men were never exposed to wet. The climate throughout the campaign was hot and dry, and even during the last cold season, the temperature during the 24 hours was very equable. Extreme variation in temperature, a fertile source of dysentery, was absent. The food procured both on the line of march and in cantonment was good, though often scanty. The treatment pursued has been that advocated by Twining, in its fullest acceptation, merely adding the disulphate of quinine in gr. iii. doses, as I hold the opinion that dysentery in this country may almost invariably be traced to the existence of malaria: remove the most fertile sources of malaria,—as a ferruginous soil—marshy deposits—decomposing vegetable matter,—moisture and heat,—and this disease is not prevalent. Great heat and ferruginous soil may

exist as during the recent campaign, but the exemption from the other causes of malaria account for the comparative absence of dysentery.

Of colic, 20 cases have been admitted. In the sepoy, colic almost invariably arises either from eating unripe fruit, or too much or unwholesome food; and an emetic, followed by a full dose of colocynth and opium, or castor oil with tincture of opium is required: or it may arise from drinking large quantities of water when heated or fatigued; in such cases compound spirit of ammonia or sulphuric æther combined with tincture of opium, brandy, and mint julep, given once or twice relieves the pain and griping. Of diarrhœa, 22 cases have been admitted. With the exception of an officer, already alluded to, all were discharged well. No case calls for particular observation; but as some occurred in July and August, when diarrhœa prevailed throughout the force at Gwalior, I will detail the symptoms which characterized the disease at that period. The symptoms were very uniform, whether affecting officers or men; but aggravated if the patient was cachectic, or his constitution injured by intoxicating drinks. Without any apparent cause,—the food being good, the water excellent, the atmosphere warm and moist, the wind being westerly or south-westerly,—a diarrhœa suddenly came on; the discharges were fæculent, in large quantities, and frequent; each discharge preceded by slight griping pain, and an irresistible desire to stool. The discharges were of various colors and consistency; sometimes mixed with blood and mucus, sometimes choleraic in character. Cases like this continued for weeks; producing, in some instances, extreme prostration and loss of flesh, in others only slight lassitude: the appetite generally failed; the tongue was coated at the base, but moist, with clean margins; no pyrexia; the skin soft and moist; the urine healthy, of natural quantity, sometimes very pale, at others high-colored; there was generally a sense of oppression in the right hypochondrium and in the perærcordial region, but there was no enlargement of the liver, nor pain on pressure. A few cases among the European soldiers proved fatal, but none under my own care. Every form of astringents, alteratives, and

counter-irritants, was tried; I found small and repeated doses of blue pill combined with quinine and extract of catechu efficacious, with sinapisms to the abdomen. Tannin or gallic acid was given, and occasionally a mild laxative; the strength was supported by a nutritious diet, but tea, broth, and all stimuli, were avoided. Woollen clothing, socks, and a flannel belt were recommended to be worn, and the night air to be avoided. A change from the cantonment of Morar to the fortress of Gwalior (built on a perpendicular rock about 500 feet above the general level of the plain) often proved of more service than treatment, although at first the disease was apparently aggravated. With the advance of the monsoon, the diarrhœa gradually disappeared; and entirely so, as the dry cold weather set in. I can offer no opinion as to the pathology of the disease, not having witnessed a *post-mortem* examination.

*Ictus Solis and Cephalalgia.*—Under these designations 16 sepoys and 6 officers have been admitted, but no fatal case happened.

"Ictus solis," "Coup de soleil," "Sun fever," was characterized by the following symptoms, both in the European and Native, as far as my means of observation extended; viz. a sensation of faintness, with an inability to breathe,—deep, sighing, labored respiration,—a belief in immediate dissolution (the patient falling to the ground, unable to move)—the skin generally cold and clammy, that of the scalp comparatively hot,—face pale,—lips bloodless,—tongue and fauces dry,—eyes turned up, but pupils dilated, and obedient to light,—pulse slow and feeble, from 40 to 60 beats in a minute,—the chest heaving under long inspirations made at lengthened intervals, and expirations comparatively short—(frequently, vomiting ushered in this train of symptoms, with insensibility, but the patient could be roused to consciousness by the cold douche),—the hands and feet cold, and the nails blue. Under treatment this train of symptoms would, in some cases, be readily relieved, without any bad consequences, save a sensation of extreme exhaustion. Several patients returned at once to duty, others in a few days, whilst some officers and men had several seizures in one day (as during the action at Koonch), rallying from each, and resuming their active duties. In other cases when

re-action commenced, severe tetanic spasms would affect the whole muscular system, commencing in the extremities, passing on to the muscles of the spine, face, and neck, and lastly those of respiration, when death ensued. In some cases, consequent on re-action, ardent fever set in, which soon ended in coma and death. In other instances no re-action took place, and the patient died with all the symptoms of extreme collapse.

As the primary train of symptoms in the majority of instances occurred in men who were exhausted by a long march, or by compulsory abstinence from food (often a dram of spirits being given on an empty stomach, with the view of affording strength to the exhausted frame), and were then exposed to the direct rays of the sun, in an open country, either in actual conflict with the enemy (when all the nervous and physical energies were in a state of tension), or on picquet duty (the monotony of which left external influences of a depressing nature the fullest power of action), I am of opinion that the disease is one of the asthenic type, the primary cause being general exhaustion of nervous power, the collapse a consequence of deficient oxygenation of the blood; and in those who died in this state, the heart was, I believe, found empty, or containing only a small quantity of dark fluid blood, the lungs gorged with dark blood. The doubtful question to my mind is, on what portion of the nervous system did the sun primarily act, to produce the depressing symptoms which ushered in every form of this disease? As vomiting was, in the majority of cases, the first symptom, or immediate syncope, I believe the solar plexus to have been primarily affected.* The direct rays of the sun, under the exhaustive effect of the causes I have named, produce a prejudicial effect on that important centre of the organic nervous system. The intimate connection of the solar with the cardiac and pulmonary plexuses, and with the spinal column and brain, sufficiently account for the peculiar train of symptoms which follows. Each case reminded me of the effect of a violent blow on the stomach. That there was no cerebral lesion in the primary attack, I am

* Hence experience teaches the Indian sportsman, as well as the native of this country, to wind thick folds of cloth round the loins and stomach.

confident; for in every instance consciousness was intact, and coma was a secondary symptom. That this malady cannot be connected with any type of fever, any poisonous action (from any specific agent) on the blood, is equally evident; as the seizure was sudden, not preceded by rigors nor any premonitory symptom, frequently rallied from in a few minutes, even in the most extreme cases; showing that no process of elimination is necessary for perfect and almost immediate recovery. I believe, therefore, that the whole train of symptoms is caused by the direct rays of heat upon the sympathetic system of nerves, in a previously exhausted frame.

As predisposing causes to this affection, I would name the use of ardent spirits, especially as a stimulus to exhausted nervous and physical powers, and the want of acclimatization. The latter received strong proof in the fact, that the majority of cases occurred among the young soldiers of H.M.'s 71st Light Infantry.

The treatment employed for the relief of the primary symptoms was the cold douche to the head; turning the body on one side; removing every cause of constriction round the neck; rubbing the chest and abdomen with brandy; shampooing the extremities; affording free admission of air; and giving stimulants, as spirit of ammonia or brandy, mixed with a little water, at short intervals. When the respiration was very labored, a pretty full dose of tincture of opium added to the above, produced, as it does in the dyspnœa of the last stage of phthisis a most beneficial effect.

Under this plan of treatment all the cases I witnessed rallied. I had no case to treat in which the ardent fever or comatose symptoms were sequelæ. The exhaustion consequent on the attack was generally relieved by nutritious diet, attention to the bowels, and rest. A severe and prolonged cephalalgia resulted in some cases, which yielded to a course of mild alteratives and tonics.

*Venereal Diseases.*—Under this class of diseases 17 cases have been admitted; and all discharged cured, with one exception already alluded to. I introduce the subject of syphilis into this report, merely to add my voice to that of others who now

advocate the avoidance of mercury, except in those cases, where the base of the chancre is hard and unyielding. In all the cases which came under my care, this symptom was wanting; and the ulcers were generally of an irregular form with excavated margins, a yellow unhealthy slough on their surface, an inflamed margin, and an inclination to spread; affecting the glans penis, the corona glandis, and inner surface of the prepuce. I would term them cases of "Venerola," in contradistinction to the true form of venereal disease, or what is termed the true Hunterian chancre: this latter requires mercury for its cure,—the former is only aggravated by its use. I have therefore found that attention to the improvement of the general health and strength, and the local application of soothing remedies, as simple ointment alone, or combined with opium, or the warm-water dressing, are sufficient to produce a clean, healthy, granulating surface; when an occasional application of the nitrate of silver speedily effects a cure. If a tendency to sloughing is exhibited, the free application of the pure nitric acid, once, or at most twice, will arrest the unhealthy action, and then the soothing treatment is speedily followed by the best result. Another form of venerola, if I may so term it, also presents itself, in which three or four ulcers (circular) with an elevated centre like a small fungus, and a profuse glairy discharge, were found on the glans and corona, without the least hardness of base. These I touched daily, from the first, with nitrate of silver, applying simple ointment with opium; and they healed in 10 or 12 days. I have not witnessed secondary symptoms in such cases as I have described.

*Dracunculus.*—16 cases were admitted into Hospital after the regiment was quartered at Gwalior; in the majority of instances in young and healthy but tall high-caste men, natives of Oude. The feet, ankles, legs, and thighs were chiefly attacked. In some cases the men did not present themselves till efforts had been made to extract the worm; which breaking, a large unhealthy sloughing ulcer with inflamed margins was the result. In others a circle of inflammatory redness, having a dark livid vesicle in the centre presented; on removing this, a coil of the worm would be found, and the usual method of removal com-

menced. In a few there would be no sign but a slight swelling of the surface; no change of colour; much pain, only a cordy feeling. On gentle manipulation of the part, cutting down carefully, a coil of the worm would be readily secured.

Owing to the unhealthy diathesis of the men, arising either from the scurvy taint or from privation, even in those cases where the worm came away entire, ulceration and sloughing along its course ensued; in one case, the whole length of the inside of the thigh became the seat of an unhealthy sinus, with profuse discharge; in all, a general atrophy of the body ensued, from the constant pain, and profuse discharge; and, although all recovered, it became necessary to permit many to return to their homes, as they were unfit for duty. The treatment consisted in perfect rest, a nutritious diet, with wine and bark, and local remedies suited to the varying condition of the parts.

*Gun-shot and Incised Wounds.*—The number treated during the campaign in Central India was:—Gunshot wounds 40, incised wounds 11, from the 1st April 1858 to the 20th June. When the fortress of Gwalior fell, active operations, on an extended scale, ceased.

There were no cases of hospital gangrene, nor traumatic tetanus; though, in the majority of instances, extensive sloughing took place, arising, as already noticed, from the cachectic condition of the men, produced by a general taint of scurvy and by the heat of the weather.

It is remarkable that but few operations were performed in the whole force throughout the campaign. This arose from the very little use made by the enemy of their artillery: it was either used so badly as to be innocuous, or captured so quickly that it was rendered harmless. I saw but three instances of injury from round shot in the 25th regiment; the first, a sepoy, mentioned in last year's report.* The second instance was at Jhansi, when a round shot from the fort struck a mass of rock forming part of the cover to one of our batteries, and, bounding off, injured a sepoy on the right shoulder as he was stooping: the integument over the scapula was raised in the form of a blister, without any injury

* Page 8 ante.

to the subjacent tissues or bone. The man was brought to hospital in a state of collapse. Excessive pain, and loss of power in the arm ensued for some time, and a rather severe attack of pneumonia ensued, but he eventually quite recovered. The third instance, whose case and its fatal results I have already described.*

The majority of wounds were, therefore, gun-shot from the common musket and matchlock. The wound from the musket ball has the usual round depressed hole of entrance, with the more torn one of exit: the matchlock ball is very small, and of hammered iron; it produces but a small opening, and consequently much less injury to the soft tissues, and its place of exit can scarcely be distinguished from that of entrance. My experience of gun-shot wounds teaches me the excellency of the practice Guthrie so earnestly enjoined, viz. to assist, not to interfere with, nature; to use the simplest and most soothing applications; to avoid greasy applications, and numerous coverings; to maintain perfect rest, and cleanliness; to rouse the system when in the primary state of collapse by mild stimuli, combined with opium; to avoid every cause of excitement; and, as union of the soft tissues progresses, to maintain gentle motion of the joints, in the neighbourhood of which the injury has occurred; and thus finally, to prevent contractions and distortions. I can also testify to the excellence of his instructions in the treatment of general hæmorrhage from several small vessels, so frequent an attendant upon large exposed surfaces, viz. the application of one layer of soft cloth dipped in cold water and vinegar: this, and exposure to the atmosphere, or allowing cold water to trickle over the surface, ever proved sufficient to arrest these hæmorrhages. I must be permitted to offer my humble remonstrance at the poor economy shown in not furnishing all hospitals in the field liberally with the oiled silk, or thin gutta percha leaf. The substitute enjoined, of brown paper soaked in linseed oil, is a most filthy and painful application; it is always stiff, and will not become adapted to the curvatures of the frame; and in such positions as the face, neck, and about the joints is useless. I was compelled to use thin cloth covered with simple ointment instead; and even

* Page 16 ante.

on the surface of the body or limbs, this greased paper will not lie close to the skin, as the gutta percha and oiled silk do, but requires a bandage to retain it *in situ*, thereby rendering pressure and an amount of covering necessary, most injurious to the wound, and painful to the patient. It is a disgusting and filthy substitute, even in civil, or rather peace practice, for that elegant and healthy mode of dressing wounds, ulcers, and inflamed tissues so ably advocated by Liston, Guthrie, and all English surgeons.*

Having already alluded to the causes which exercised so baneful an influence on the union of wounds, and having related the treatment adopted to relieve their evil effects, I now proceed to give a summary of the most interesting cases which occurred during the campaign in Central India, dividing them as they affected the different regions of the body: the milder cases I make no allusion to—they all recovered.

*Gun-Shot Wounds of the Upper Extremity, and in the neighbourhood of the Shoulder Joint.*

1. Private R. M. While entering the breach at Jhansi with the storming party on 3rd April 1858, received a gun-shot wound on the left fore-arm from a musket ball: it struck the arm two inches above the wrist in front of the ulna, passed upwards and outwards, fracturing that bone, probably dividing the ulna nerve, as there is loss of power and sensation in the ring and little fingers—the artery was uninjured. Having removed some portions of cloth and a loose piece of bone, a splint was applied to the anterior and posterior surfaces of the fore-arm, the wounds left exposed, and warm-water dressing applied. I left the case in the Field Hospital at Jhansi, when the regiment moved to Calpee, progressing favorably. He rejoined the regiment in November quite well, but with partial loss of power in the hand.

2. Private M. P. Wounded by a matchlock ball at the same time as the last; the ball passing through the deltoid and extensor muscles of left arm. Recovered without any untoward symptom, under the use of warm-water dressing, and eventually of careful bandaging.

3. Private B. M. Struck by a musket ball from the Fort at Jhansi; the ball making its entrance just anterior to the acromion process of the right

* NOTE *by the Secretary*.—It is unfortunate that Dr. Stuart had not the means of obtaining properly prepared oil-paper, than which, according to the experience of all hospital surgeons on this side of India, nothing can be more simple, clean, and efficacious.

scapula, passed directly inwards and downwards, entering the thoracic cavity. The shoulder joint was injured; air passed through the wound for three or four days on a deep inspiration: there were severe pneumonic symptoms for about a fortnight. The wound was nearly three months healing; is now perfectly closed; and, except an inability to raise the arm above the head, and free motion of the shoulder joint, he experiences no inconvenience from the injury.

4. Private B. D. While raising his musket to fire at a man just above him, received a musket ball in the middle of anterior surface of left arm; the ball evidently passing between the radius and ulna, close up to, if not into, the elbowjoint. When brought into hospital there was a little venous hæmorrhage, much swelling of the fore arm, and pain, especially in trying to perform the motions of pronation and supination. I could not reach the ball with my finger or the probe, nor feel it from the exterior surface of joint. In consultation, it was decided to save the arm, and not to interfere with the ball at present. The injury occurred on 3rd April: up to the 15th, several deep incisions were made to relieve the collections of pus under the superficial and deep fascia; hot fomentations and charcoal poultices locally, and salines with morphia internally, formed the treatment. On 15th, the ball was removed from between the two bones close up to the articulation of the ulna with the radius,—the joint was uninjured. The large surfaces caused by the incisions were now presenting the fungoid appearance, and discharging the fœtid pus I have described, as an attendant on all cases, in which the scurvy taint was present, as in this; but, being a young man, much relieved by the removal of the ball, the radial and ulna arteries intact, and it being a certainty that if the arm was removed, the stump would assume the same unhealthy action, it was again agreed upon in consultation, to try to save the arm. That night an oozing of blood commenced from the surface of the wounds, from numerous points, which was arrested by the application of cloths dipped in vinegar and cold water. On the evening of 16th the bleeding was again arrested. During the night (when not noticed), it occurred again to such an extent, that he died from exhaustion the following day. In this case it is a question, whether ligature of the brachial artery might not have arrested the hæmorrhage and saved life.

5. Private G. At Jhansi on 3rd April, a matchlock ball entered the inner margin of right elbow-joint, passed across its posterior surface, fractured the olecranon, and made its exit anterior to the external condyle, which was also fractured. Excessive inflammation and swelling ensued; but this was subdued by free leeching, fomentation, and perfect rest; by fixing the arm in a fixed position to a triangular splint, made for the purpose, fitting to the anterior surface of the arm and fore-arm; attending, at the same time, to the general health. The arm was saved; with a very tolerable amount of motion. He can neither quite extend nor flex the arm. The hand possesses its full power

6. Private J. P. A matchlock ball passed through the fleshy portion of the left fore-arm. The wounds healed after much sloughing: he suffered from

scurvy. Warm water dressing, and eventually a lotion composed of sulphate of zinc, 2 grains to the oz., effected a healthy union.

7. Naique E. J. In an encounter with some of the enemy in a walled court-yard at Jhansi, on 5th April, was struck by a musket ball in the centre of the right clavicle, and nearly an inch of it was crushed into small portions. The ball passing outwards and backwards, was found imbedded in the supra-spinatus muscle, from which it was removed; no vessel of importance was injured; very little hæmorrhage. Having removed all the pieces of loose bone in the wound, and some pieces of cloth, the fore-arm was placed on a splint, and supported upon a large sling. In a few days the rough jagged edges of the broken clavicle were removed (about an inch and a quarter of the bone); a bandage was applied sufficiently tight to keep the shoulder steady, and the ends of the bone placed as nearly in apposition as possible, with the fore-arm in a sling: the wound was treated with the warm-water dressing only, carefully cleaning out the sloughs and discharge with lint dipped in a weak solution of chloride of lime. He was left at Jhansi, rejoined the regiment in November, with the wound quite healed, but the arm powerless, much wasted, and motion between the ends of the clavicle; these have now united by cartilage, and he is gaining a little motion in the arm.

8. Private B. B. Struck by a spent musket ball on the centre of the left clavicle at Calpee, on 21st May. The bone was fractured, and somewhat splintered; the ball was found lodged just above it, and removed; no hæmorrhage. By the use of a clavicle bandage, sling, and warm-water dressing, the case did very well from the first: a few small splinters of bone have come away: the fracture is now firmly united.

9. Private C. M. Was hit by a matchlock ball at the junction of the clavicle with acromion process of the scapula; portions of the bone were knocked off, and eventually came away. The ball appears to have passed under the acromion process, and lodged itself most probably among the dorsal muscles; it has not been discovered, but gives no inconvenience. The wound is now quite healed.

10. Private D. S. A matchlock ball entered the anterior border of the axillary space, at the free border of the pectoralis major; passed across the space, without injuring any of the vessels or nerves, and was removed from the posterior margin of the axilla. This case healed without anything occurring worthy of note.

*Gun-shot Wounds of the Lower Extremity and Loins.*

11. Private P. J. Struck at Jhansi by a matchlock ball near the inner margin of the left patella, without any injury to that bone. The ball passed inwards and backwards, and made its exit about the centre of the inner margin of the head of the tibia. The synovial membrane of the joint was uninjured: there was much swelling, pain, and heat of the whole joint; but by free leeching, perfect rest, hot fomentations, and the administration of antimony,

this was subdued; and, under the use of the warm-water dressing, the wound healed. He has now perfect use of the joint.

2. Private A. This was a mere superficial wound by a musket ball, across the outer border of left thigh; the skin, cellular tissue, and superficial fascia much torn. Under ordinary circumstances this would, after the usual slough separated, have rapidly healed; but, as he was suffering severely from scurvy, the surface of the wound assumed the appearance of a malignant fungus, requiring the application of nitric acid, till the unhealthy surface was destroyed. Warm-water dressing or bran poultices were applied to soothe, and to assist the removal of the sloughs. Eventually the use of a weak solution of sulphate of zinc or the nitrate of silver, and simple ointment, with careful bandaging effected a cure.

3. Private B. N. Was shot through the flexor muscles of the left thigh, just below the insertion of the gluteal muscle, at Loharee, on 2nd May 1858, by a musket ball; the soft tissues much lacerated. He was sent into the Field Hospital at Jhansi the following day. He rejoined the regiment at Gwalior in November, with loss of the whole mass of the flexor muscles, and part of the gluteal, permanent contraction of the leg upon the thigh, and total loss of use in the limb. His history was that of excessive sloughing, with the unhealthy condition I have already described: he suffered severely from scurvy.

4. Private E. P. Shot through the loins by a musket ball at Calpee, on 22nd May; the ball entering two inches to the right of the spinal column, passing anterior to the third lumber vertebra, which it was supposed to have struck, but without fracture, and made its exit a little to its left; very little hæmorrhage; severe collapse, relieved by stimuli; loss of power, and partial loss of sensation; unable to micturate, a catheter constantly required; eventually passed his stools involuntarily; died on June 16th.

5. Private O. T. Struck by a matchlock ball at Calpee, about the middle of upper third of right thigh on its anterior surface; the ball passing backwards, to inner side of femoral vessels, made its exit just below the trochanter major. This case did well throughout, under the use of warm-water, keeping the recumbent posture, and careful bandaging; has perfect use of the limb.

6. Private D. S. On the 3rd April 1858, at Jhansi, was struck in the left groin by a musket ball, which entering just below Poupart's ligament, midway between the spinous process of the pubis and femoral vessels, passed inwards, downwards, and backwards, fractured the ascending ramus of the ischium, leaving a small portion of its anterior border intact: it appeared then to have passed through the prostrate gland, rupturing the urethra, and then to have entered the pelvic cavity; the rectum was uninjured; there was very little hæmorrhage; his urine passed in large quantities through the wound; for a few days a little passed through the urethra: he had no abdominal pain; there was no infiltration of urine into the perineum or scrotum, nor did any occur; but as the slough came away it passed entirely through the wound, causing at last extensive sloughing, and death

from exhaustion, on 24th April. The treatment after the wound had been carefully cleansed, loose portions of cloth and bone removed, consisted in enjoining due observance of continued rest in the recumbent posture, the warm-water dressing by means of a sponge covered with oiled cloth, frequently removed, cleansed, and changed; the administration of liquor potassæ with hyosciamus and other opiates, and supporting the general strength with nutritious diet, wine, and tonics. It was considered unadvisable to pass a catheter until the sloughing away of injured tissue gave some indication of the amount of injury. As no sign of peritonitis was exhibited, it is certain no urine was effused into the abdominal cavity. The man progressed so favorably for about fourteen days, that recovery was anticipated; but, without any evident cause, he began to sink on the 18th, became daily weaker, and died on the 24th April.

*Gun-shot Wound of Thoracic Cavity.*—Private K. M. Wounded at Jhansi; a musket ball entered the left side of the thorax, between the third and fourth ribs, about two inches external to the nipple, and passing downwards and backwards made its exit between the fifth and sixth ribs near their articulation with the lateral processes of the corresponding vertebræ. The ball passed directly through the lungs; air and frothy blood issued from both wounds. He was admitted in a state of collapse; but under the use of wine and diffusible stimuli, combined with full doses of opium to relieve the dyspnœa, he rallied: the wounds, when cleansed, were covered with the warm-water dressing, retained *in situ* by a broad bandage, and he was placed in the semi-recumbent position. Being a man of cachectic habit and worn out, active inflammatory symptoms were not developed, but the reverse: opium, combined with stimulants and tonics, formed the treatment for the three weeks he remained under my care; and the local treatment was only varied for a short time by the use of charcoal poultices, while the sloughs were coming away: he progressed favourably, and I had hopes that, with strict quiet, he would recover. He lived till the beginning of November, the wounds having healed, but he suffered much from dyspnœa. On the march of the sick and wounded from Jhansi (where he had been left) to Gwalior, although conveyed in a cart, he was suddenly seized with violent coughing and dyspnœa, which speedily ended in death. The adhesions which had been formed between the two surfaces of the pleura, surrounding the wounded portions of the lung, doubtless gave way under the jolting of the cart; the cicatrized lung, perhaps, ruptured; and effusion into the pleuritic cavity ensuing, death was the result.

*Gun-shot Wounds of the Abdominal and of the Pelvic Cavities.*—All these cases proved fatal. This may be readily accounted for, as, in every abdominal wound, the ball passed through the liver, and being fired at point-blank distance, sometimes from the weapon close to the wounded man, the intestines were also

most probably much torn: as I could obtain no *post-mortem* examination, this remains conjecture. These cases were admitted in a state of extreme collapse; surface pale, and bedewed with a cold clammy moisture; almost pulseless; the abdomen distended, acutely painful on motion or pressure. With one exception, death ensued within five hours; and except to relieve the intense suffering, all treatment was valueless; the wounds were mortal. In the case of an officer, although he lived fifteen hours, and the free removal of blood from the arm when reaction had taken place, reduced the pulse, relieved the acute pain and dyspnœa, yet the continued effusion of blood into the abdominal cavity, rendered recovery impossible, and all medical treatment, except to relieve pain and suffering, a mere useless interference.

I shall, therefore, merely relate the situation of the wounds, and probable course of the ball. The treatment consisted in merely rendering the sufferer as comfortable as possible, and relieving his anguish by opiates and soothing drinks; extreme thrist being, in these cases, a prominent symptom.

1. B. A. Shot during the storming of Jhansi on the 3rd April. A musket ball entered between the 9th and 10th ribs about two inches from their cartilaginous union on the right side, making a hole into which two fingers might have been thrust. Appeared to have passed in a direct line through the abdominal cavity, making its exit to the left of the 10th dorsal vertebra. There was much hæmorrhage at first; but when brought to the hospital tent, only a slight oozing was going on externally. The abdomen was much distended, and acutely painful: he never rallied from the collapse consequent on the injury, and died in about eight hours.

2. Private B. K. Shot while firing from above into a court-yard in Jhansi on the 6th April. A musket ball entered close to the cartilaginous union of and between the 7th and 8th ribs on the right side; passed upwards and backwards, making its exit to the right of the spinal column, about two inches above the level of the anterior wound. He lived only half an hour after reaching the hospital tent.

3. Private F. K. Was shot at Calpee on the 22nd May. A musket ball entered between the 8th and 9th ribs on the right side, one inch from their cartilaginous border, and passed into the abdominal cavity. There was no other wound: the situation of the ball could not be ascertained. He died in 5 hours.

4. Lieutenant R. Commanded the party which entered the Fortress of Gwalior on the morning of the 20th June, then held by a small band of fanatics. After an obstinate resistance, in which several men of the regiment

were killed and wounded, chiefly by sword-cuts, and when he believed all the enemy were killed, he advanced some paces in front of his party to examine some small rooms and recesses where individuals might be secreted: having turned to rejoin his party, a fanatic, who had been secreted behind an adjutment of the rampart, sprang forwards, and fired a large horse pistol within two or three yards of Lieutenant R.; the ball (one of large size) entered about two inches to the right of the spinal column and between the 7th and 8th ribs, and, passing directly through the body, made its exit near the margin of the false ribs, close to the junction of the 9th and 10th. Having fallen to the ground, before assistance could reach him, he received a severe sword cut across the right hand and knee. The sepoys having speedily bayoneted his opponent, and the Hospital Assistant, who accompanied the party, having applied pledgets of lint dipped in cold water to the wounds, and used bandages, he was placed in a dooly, and conveyed down the steep descent from the fort, with the view of being brought to Hospital: fortunately the head quarters of the regiment was then advancing rapidly to secure the old city, and support Lieutenant R., and I therefore met him a short distance from the fort. He was then pale and exsanguined from loss of blood, which, at first, was profuse; his countenance was anxious; he was in much pain; and expressed his certainty that the wounds were mortal. He expressed great anxiety that I should examine them, which was done most carefully; but the instant the bandages were removed a gush of dark venous blood issued from the posterior wound, and when that was closed, it issued from the anterior. Fresh pledgets of lint, wetted with cold water, were again used, and a fold of bandage used to retain them *in situ*; the wounds of the hand and knee were dressed; an opiate was administered, and his extreme thirst relieved by acidulated drinks: he was placed on a cot in a room secured for the wounded, at the foot of the hill, on which the fort was situated. I first saw Lieutenant R. about 1 P.M. on the 20th; he was wounded probably about 11 A.M. Reaction having been fully established, and his pulse, at first fluttering and scarcely perceptible, having become full, firm, and about 140,—the pain in the abdomen acute,—about 4 P.M. I bled him freely from the arm, till the pulse fell to 80, became soft, and he expressed himself much relieved. His skin was now warm and moist; he was calm and cheerful; but the abdomen was gradually becoming more distended. He passed urine, and the bowels acted once soon after the bleeding. Calomel with opium and camphor were administered, and the intense thirst relieved by acid drinks. He continued better till about 7 P.M.; from which time he gradually became weaker; moaning, but not in great pain; sleepless, quite sensible, till about 8½ A.M. on the 21st, when he suddenly became comatose, and died about an hour after. It was impossible, under the circumstances, to make a *post-mortem* examination.

5. Private A. T. Was wounded in an attack upon a rocky eminence near Jhansi, in which some of the enemy had taken refuge, on the 3rd April 1858;

he was therefore shot from above. The ball entered about an inch below the centre of the crista ilii on the left side, passed through the ilium, making a jagged hole through which the fore-finger could be passed: the bone did not appear to be splintered. The ball then appeared to have passed in a slanting direction across the pelvic cavity, making its exit just above the right trochanter major. There was probable fracture of the sacrum, as there was total loss of power, and scarcely any sensation in the lower extremities. There was very little external hæmorrhage. Passed his urine for three or four days, then became quite unable to do so, and it was drawn off by the catheter. The urine free from blood, but very ammoniacal in odour; latterly ropy and very offensive. The stools latterly passed away involuntarily. The wounds sloughed to an unusual extent before he died, and became most offensive. He died on 15th April.

*Incised Wounds.*

1. Private G. S. Was on the baggage guard when the Force approached Calpee on 15th May: it was attacked by the enemy's cavalry. He was thrown down; and, while defending himself, received two severe sword-cuts across the right hip, and another in a diagonal direction, from the outer edge of the os calcis across the foot, laying open the articulation of the astragalus with the scaphoid bone; cutting nearly through that bone, and nearly cutting the foot off. He was brought into Hospital with the foot bound up in several folds of cloth, on removing which profuse arterial hæmorrhage occurred; a tourniquet was applied to the popliteal artery, which effectually controlled it. In consultation it was decided to remove the foot (at the articulation of the astragalus with the scaphoid bone) and os calcis, it being impossible to obtain a sufficient amount of integument to preserve the latter bone. A semicircular incision was made across the dorsum of the foot, and the head of the astragalus separated from the scaphoid bone; a posterior flap was then formed from the integument of the heel. The os calcis being dissected out, the several arterial trunks and branches of both tibial and peroneal arteries secured, and the flap formed from the heel when brought forward, gave promise of securing the man a good firm rounded stump. Unfortunately this man was suffering with scurvy; his gums were livid and ulcerated; teeth loose, and general health much impaired; instead of healthy adhesive inflammation being set up, the edges of the flap sloughed, and the whole of what formed the heel came away. He was much too exhausted to bear a secondary amputation, it was therefore decided to remove as much of the astragalus as possible, to improve the general health by wine, tonics, lime-juice, &c., to rely on careful bandaging and union by granulation, and the contraction of the surrounding integument. In five months after the accident the wound healed, leaving a rounded stump, very tender and unable to bear pressure; the leg had lost its usual size, having become reduced to the size of a man's arm by the drawing down of the integument, and total want of use for so long a period. The man's general health and strength were good. He now proceeded to his home.

2. Private L. P. Was wounded at Calpee on 15th May, by the enemy's cavalry, receiving a punctured wound from a sword just above the centre of left ilium. I passed my finger into the abdominal cavity. There was another punctured wound, comparatively superficial, close to the inferior margin of left scapula. The wounds were closed immediately on admission by strips of adhesive strapping, and united quickly. He complained of acute pain for a few days in the left iliac region; this was relieved by leeching, hot fomentation, and the administration of calomel, antimony, and opium.

3. Havildar B. S. Received, at Gwalior, on 16th June, a sword-cut across the left orbital ridge, extending from above its external angle to the inner angle of right eye; the flap formed by the left eyebrow, integument, and portion of orbicularis palpebrarum, having the bony portion of the supra-orbital ridge attached, was pendant over the eye; the nasal bones were cut through; the eye was uninjured; a small portion of the brain exposed; there was a good deal of hæmorrhage; he was quite sensible. Having dissected the bony plate off the flap, it was replaced and retained *in situ* by a few sutures, as also the divided surfaces over the nasal bones. A piece of lint, soaked in blood, was laid over the wound, and retained *in situ* by a turn of a bandage. There were also two sword cuts across the occipital bone, one of which penetrated to the brain, as could be readily detected by a probe, the other only passed through the external plate: having cleansed the wounds and shaved off the hair, the wounds were closed by adhesive plaster. These wounds healed without any untoward symptom, except slight ulceration in parts, which a weak solution of sulphate of zinc readily converted into healthy granulation: the left eyebrow, after the wound was healed, drooped slightly over the eye, but not so as to injure vision.

4. Private M. M. Received several severe sword-cuts in the attack on the fortress of Gwalior on the 20th June. One commencing posterior to, and above the left ear, extended longitudinally down the neck almost to the shoulder: there was much general hæmorrhage, but not from any large arterial trunk. There was also another sword-cut extending along the ulnar border of right arm, commencing midway between the elbow and wrist-joints, and extending to the division between the ring and middle fingers: the ulnar artery and nerve were divided. The former having been secured at its divided extremities, the margins of the wound were brought together with sutures and adhesive plaster, and the arm placed on a splint: a wound in the neck was closed in the same manner. The wounds partially healed by the first intention; but suffering from the scurvy taint, the deeper portions of both wounds took on the unhealthy action already described. However, under the use of limejuice, tonics, wine, fruit, and vegetables, and nitric acid locally, with warm water, or the simple dressing, the wounds were nearly healed; when, about six weeks after they were received, he died of pure exhaustion, caused evidently by injury of the assimilative functions. Although he partook of the food given him daily, it was simply because he was urged to do so; he invariably objected

to it. He passed one healthy stool daily, with the aid of an emema or laxative: he steadily lost flesh and sank at last in a state of emaciation. I believe the left pneumo-gastric nerve was divided, as, in addition to the loss of all desire for food, he also suffered from syncope on the least exertion: even on being raised in bed to have the wounds dressed, he would become cold; clammy perspiration would break out, and syncope ensue. Latterly severe attacks of hiccup became most distressing.

5. Private S. A. Was almost cut to pieces in the attack on the fortress of Gwalior on the 20th June; receiving a sword-cut across the upper border of the occipital bone, a large portion of which, on a flap of the scalp, was only retained by a broad base of the integument. Another sword-cut having a semicircular upper border, commencing above the left ear with its anterior border running down to the neck immediately in front of the ear, and its posterior about an inch behind it, formed a large flap, which was hanging on to the shoulder, having the external ear in the centre of its tegumentary surface, and a slice of the temporal bone more than an inch in length, and about half an inch in breadth on its inner surface; this slice of bone I dissected off the flap, which, when cleaned, I restored to its original position by numerous sutures, as also the flap on the back of the head, supporting them with strips of adhesive plaster and a bandage in addition. He had two wounds extending the whole length of the left parietal bone, about half an inch apart, cutting deep into the cranium; the left thumb was also cut off, as if carefully amputated close to the metacarpal joint; there was a severe cut across the palm of the right hand; and a superficial wound across the right shoulder: all these wounds healed without a bad symptom, except slight sloughing of the upper border of the wound which removed the ear: the ear united firmly: the man was young and healthy. This case affords a remarkable instance of the amount of injury the brain will sustain without evincing any untoward symptom.

6. Private C. S. Received a sword-cut across the fore-part of left forearm, about 1½ inches above the wrist, dividing the ulnar and median arteries and nerves, also most of the flexor tendons; the radial artery and nerve, and the bones were uninjured. Having secured both ends of the divided vessels, I brought the margins of the wounds together, applied a bandage from the fingers to the elbow, and put the arm on a splint. The wound healed, but with total loss of power in the middle, ring, and little fingers; loss of sensation on inner side of forefinger. There was no blistering or sloughing of the integument.

During the campaign two severe cases of burn, from the explosion of gunpowder, occurred; one at Dhar, in which the face, inner surfaces of both arms, part of the chest and abdomen, and inner surface of both thighs and of both legs had the integuments

severely injured; but the deeper tissues were but slightly injured. The raw-cotton was immediately applied; and under its use the greater portion of the burnt surfaces healed. Where suppuration took place it was carefully removed, and the carron oil applied; and when the ulcerated surfaces became healthy and seemed only to require the formation of a dry scale or scab to heal them, a mixture of pulvis rhei and creta ppt., in equal parts, was sprinkled over them. This case recovered without any contractions. The other case occurred at Jhansi, in a young sepoy, who, with several European soldiers, were accidentally blown up by the explosion of a small magazine of the enemy. Here, not only the integument but the deeper tissues suffered, especially on the hands and fingers, the flexures of the knee joints, the face, and neck. The raw-cotton was universally applied in this case; and as it had to be removed when saturated with discharge, carron oil, and various other applications were used. Notwithstanding every care, the hands became much contracted, the fingers almost united to each other; the left leg much bent towards the thigh; but the man recovered.

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In concluding this Report, I wish to draw attention to the fact which this campaign has fully proved, in my opinion, that the present system of dressing men in thin, light, and loose clothing is a mistake. The regiment which suffered most from the exhaustive effects of the sun was H. M.'s 71st Regiment, clothed in the new khakee. H. M.'s 86th Regiment, clothed in the loose but cloth tunics, suffered, comparatively speaking, very little indeed: certainly the former regiment had recently arrived in the country, the latter was acclimatised, but I do not think this accounted for the wide difference in the amount of suffering.

The natives of this country wear loose but wadded garments; and when using much exertion in the sun, invariably wind several folds of cloth around their waist and stomach. The experience of every sportsman in India will corroborate the advantage to be derived from it, in enabling the wearer to sustain the exhaustive effects of great fatigue, with very little or no nourishment, combined with exposure to the sun. I believe the sun exercises as injurious

an effect on the organic or sympathetic system, through the medium of the spinal column indirectly, and of the solar plexus directly, and through the medium of the sympathetic nerves on the systemic circulation, on the action of the heart, and the oxygenating function of the lungs, as the sun does upon the brain; in fact, I think more so, and native experience proves it; for, while the native will constantly leave his bare scalp exposed, he invariably wears the kummerbund. While, therefore, attention is paid to the head-dress,—and this should be a leather helmet with funnel-like entrance above, with a white cover and puggree, instead of one of light basket-work recently introduced, most uncomfortable to the wearer, and liable to be broken,—more attention should be paid to protecting the spinal column, and the great centres of the organic system of nerves, by using a light, loose coat, well wadded, or made of a light woollen material.

Let the administration of spirits early in the morning, after a march,—with or without a continuance of fatigue or subsequent exposure to the sun,—be discontinued; it affords only temporary exhiliration and only temporary strength; the consequent depression is all the more intense. If, when such support was likely to be required, the soldier eat a good lump of bread (which fills the stomach and is easily digested,—not biscuit, which remains a solid indigestible mass on his stomach), and had, in addition, a pint of warm coffee, he would be enabled to sustain any amount of fatigue or of exposure to the sun with comparative impunity.

For the carriage of the sick and wounded the dooly surpasses every other form; but every dooly should be so made, that its external covering is removable at pleasure, leaving the lower framework a useful bed, from which the wounded man need not be removed: these frames thus become permanent cots. The doolies with the covering permanently attached to the frames should be discarded: no wounded man can be placed in or removed from them, without great suffering; and they cannot be used as cots in hospital.

Every hospital tent ought to be supplied with tarpaulins sufficient to cover the entire enclosed space, and thus protect the sick from the damp earth and other sources so injurious to health.

The absence of these tarpaulins proved most injurious when marching in rainy weather. If even tents for the healthy could be supplied with them, much sickness would be prevented: dry grass is a poor substitute.

The medicine panniers, supplied at the commencement of the campaign, proved most useful and convenient.

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*Annual Return of Sick of the 25th Regiment N. L. I., for the Year* 1858-59.

STRENGTH 596·5. *Poona, 1st April* 1859.

| | Treated. | Died. |
|---|---|---|
| Fevers | 230 | .. |
| Eruptive Fevers | 3 | .. |
| Diseases of the Lungs | 8 | .. |
| Diseases of the Liver | 2 | .. |
| Diseases of the Stomach and Bowels | 58 | 1 |
| Epidemic Cholera | 1 | 1 |
| Diseases of the Brain | 24 | .. |
| Rheumatic Affections | 23 | .. |
| Venereal Affections | 30 | 1 |
| Abscesses and Ulcers | 47 | 1 |
| Wounds and Injuries | 113 | 9 |
| Diseases of the Eye | 5 | .. |
| „ of the Skin | 2 | .. |
| Other Diseases | 24 | .. |
| Total | 570 | 13 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 95 6 |
| Ditto of deaths to ditto | 2·1 |
| Ditto of ditto to treated | 2·2 |
| Daily average number of sick | 17·7 |

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# REMARKS ON THE PREVALENT DISEASES OF UPPER SIND AMONGST EUROPEAN TROOPS.

BY, ASSISTANT SURGEON A. K. SIMPSON, M.D.

Presented by the Director General, Medical Department.

In these brief remarks I propose to give a general view of the more prevalent diseases which have been observed by me amongst European troops at Hydrabad, Sukkur, and Shikarpoor since the middle of September 1857.

As each of these stations has exhibited peculiarities in the more important diseases (fevers, dysentery, and hepatitis), a separate account of each will be given, to indicate these peculiarities.

Hydrabad.—From middle of September to end of October.

*Diseases.*—Intermittent quotidian fever, dysentery, and hepatitis.

*Troops.*—One Company of Reserved Artillery, and Detachment H. M.'s 4th (King's Own).

The prevalent fever at Hydrabad during the abovementioned period was quotidian intermittent, complicated often with visceral symptoms. These symptoms were sometimes unimportant, but occasionally initiated some other disease, as hepatitis or dysentery. The usual practice I adopted in the first class of cases—quotidian intermittent fevers without serous complication—was the following:—to give quinine mixture (gr. v. to ℥i.) 3 times daily, in doses never exceeding two ounces. These doses were administered every 2 hours, so as to anticipate the expected febrile accession. The treatment was continued while the fever remained unsubdued, which seldom exceeded two or three days. More commonly the amount of quinine could be diminished one-half on the second day of treatment; after which it might be still further reduced, and yet be adequate to overcome the tendency to return of fever. Thus it was attempted to make the amount of quinine

administered dependent only on the requirement of each case of fever, in respect of severity, duration, and progress towards recovery. This system is at once economical and efficacious. When constipation preceded attacks of fever, opening medicine was administered; not to induce copious purgation without some adequate reason, but simply to relieve the constipated state of the bowels. A little calomel and rhubarb, or castor oil, or any other gentle purgative, was, in ordinary instances, sufficient for such purposes.

But an opposite state of the alimentary system, diarrhœa and vomiting, much oftener characterized quotidian intermittent fever at Hydrabad. These symptoms seldom proved serous complications, except in two cases, which will subsequently receive a fuller description, on account of their importance. Those slighter instances, then, of diarrhœa and vomiting, yielded to the ordinary treatment by mustard poultices over the stomach, by tincture of opium in combination with quinine or with acetate of lead, and by tincture of opium (ʒss.) in combination with castor oil (℥ss.), which in many instances proved very successful. It was necessary sometimes, in cases of gastric irritability, to encourage vomiting by an emetic, and sometimes to check it by every possible means. With the latter view, it was often found advantageous to give quinine in the form of pills with opium. The administration of quinine ought not to be delayed, according to my experience, till these symptoms (diarrhœa and vomiting, which complicate intermittent fever) may have subsided, because they depend on the cause itself of the fever, and are a part of its manifestations.

The other two cases, presenting complication similar to the above, but of much greater intensity, and demanding a more vigorous mode of treatment, must now be shortly noticed. The more serious of these two cases will suffice as an example. This short history of it is extracted from the record kept at the time, and still in my possession.

I was suddenly called at 2 P.M., of the 7th October 1857, to visit a man in the barrack who had been seized shortly before with the following symptoms (cholera I was led to understand):— incessant purging, vomiting, and retching, and agonizing spasms.

I found this patient, a man of robust frame, had been under these symptoms for two hours. The fæces, however, were not choleraic, for they were liquid and blood-tinged; nor were they dysenteric, for there was no tenesmus, besides the discordance with dysentery in the rapid development and intensity of the symptoms. They were referred to the usual cause of fever exciting visceral congestions. The treatment consisted at first in attempting to allay the vomiting, purging, and cramps by mustard poultices over the stomach and lower abdomen, by chloroform in small and frequently-repeated doses (♏xv.), every half-hour, for two hours, by frictions assiduously applied to the extremities with turpentine liniment, and by hot applications to the feet. These measures partly succeeded in allaying the vomiting and cramp. But symptoms of collapse soon appeared to be supervening. The pulse became small and rapid, and the extremities and general surface felt cold. Then stimulants were given in small and frequent doses, with the twofold view of being thus more likely to be retained on the stomach and of ensuring constant attendance on the patient. The stimulants were ammonia in gr. v. doses, every 10 minutes, alternated with one tea-spoonful of brandy every 10 minutes. At the same time acetate of lead was administered, first by enema, but unsuccessfully, and afterwards in the form of pills with the ammonia. At this stage of the disease it was considered unsafe to give opium. Under this treatment the purging was found to have ceased at 6 P.M., and the vomiting to have become much less; but the cramps still continued, though less severe, and the prostration remained much the same. Stimulants as before, and frictions and hot applications were persevered in until 10 P.M., when the patient was again visited, and found in the same prostrate condition, but otherwise relieved. Very small doses (♏x.) of tincture of opium were now administered with the brandy every half-hour for two hours, to induce sleep. The following extract from the record of this case shows the condition of the patient next morning:—"*October 8th.*—Appearance better this morning, though prostration still great; pulse feeble, frequent, and intermittent. Minute inquiry as to the patient's feelings yesterday elicits the information that he became coldish in his

extremities, and a short time afterwards, 2 P.M., hotter than usual. This shows he had an attack of fever. Bowels not opened since last night." Quinine mixture ℥i. to be given 3 times, once every 2 hours; continue ammonia as before; give brandy (two tea-spoonfuls) every half-hour till the pulse becomes fuller. The same evening vomiting returned and continued. Chloroform was administered as before, and another mustard poultice applied; and the stimulants continued, but less frequently. Under this treatment the vomiting ceased at 10 P.M. Next morning the following notes were taken of the case:—"9*th*.—Patient appears feebler this morning; pulse scarcely perceptible at the wrist, and very frequent; cold perspiration suffuses the extremities; feet very cold, notwithstanding constant hot applications; bowels opened this morning, fæces liquid and bilious; tongue coated yellow. Patient feels weaker, but has no pain. Continue stimulants,—ammonia as before, brandy every half-hour (brandy was now nauseated). ℞ Calomel gr. iii., pil. hydrargyri gr. ii., immediately; frictions to extremities; sponging of body with warm water, and smart drying afterwards with towels, every 2 hours." The next morning's report shows that this treatment proved signally efficacious. Almost immediately after sponging with warm water, improvement took place. Instead of brandy, port wine with hot water was substituted, and given frequently in small quantities. Henceforth the patient steadily improved. All symptoms of sinking now having disappeared, stimulation by the above means, gradually diminished, was continued for two days more, after which no special treatment was needed. This patient was discharged on the 19th October, having been for several days quite well; but he returned on the 22nd under the same symptoms, though much less severe. The same kind of treatment brought about a speedy recovery, after which he continued well. This case, illustrative of the visceral complication of intermittent fever, I have been induced to detail so minutely on account of its unusual severity, and to show the course of treatment which was attended with success.

The Civil Surgeon, then at Hydrabad, soon after encountered one or two cases of a similar nature. Their occurrence was attributed, not so much to any external cause, as to the constitu-

tion and habits of the patient himself. At all events, the case above detailed I assigned chiefly to sudden cooling of the body after excessive perspiration from playing at cricket.

The cases of hepatitis and dysentery which occurred at Hydrabad during the above mentioned period were all associated with intermittent fever. Those of dysentery were both very severe and difficult to subdue. The treatment pursued in two of them was the following:—after leeching over the seat of abdominal pain, and, if much straining were present, leeches to the anus, ipecacuanha and opium were administered internally in large doses (two grains of each in a pill), repeated every two hours. This amount of opium has been continued, in some instances, both night and day, for 2 or 3 days, without producing more than a slight narcotic effect. Ipecacuanha in this quantity is usually not tolerated for a longer period. I then either prescribed smaller doses of it, or substituted acetate of lead. Leeches to the anus, applied early, have, in my experience, invariably given great relief. Administering enemas too soon, when straining is very painful, appears unadvisable. After leeching (12 leeches are usually sufficient to give great relief when applied around the anus) opiate enemas, or acetate of lead and opium, or tepid water, according to the feeling of the patient and the effect produced, are important remedies. Large depletions seem, to be unnecessary and unwarrantable in severe cases of dysentery, even though early employed. But the use of port wine in large quantities, given fearlessly and at an early stage, has been found to support the strength, without increasing or in any sense interfering with local inflammation. Both of these cases received this treatment. In one of them, the severer and more persistent, wine was given on the second day. This case exhibited in its progress very extensive and serious disease, the inflammation travelling down the rectum, and resulting in detachment of the mucous lining from a portion of the bowels. His recovery was protracted, and rendered long doubtful, by this result. All sorts of astringent medicines were attempted in vain to check the disease, which graduated into diarrhœa—except gallic acid, which at the time was not procurable. Hepatitis (acute) occurred

twice while I remained at Hydrabad, and hepatic congestions more or less important, were not uncommon; these latter yielded readily to mercurial purgatives and local depletions.

Sukkur.—From 13th November to 4th December 1857.

*Diseases.*—Intermittent fever, hepatitis, and dysentery.

*Troops.*—Company H. M.'s 4th (the King's Own), and Invalids of 1st Reserve Artillery.

At Sukkur neither hepatitis nor dysentery originated among the Europeans recently arrived from Europe. For a week previous to my taking medical charge, and for two weeks afterwards, one-half of this company (H. M.'s 4th Regiment) generally were in hospital at the same time, and two men only escaped from intermittent fever while they remained there. The most frequent characteristic of intermittent fever during that period was vomiting and purging, seldom serous, but reducing the strength of the men, and protracting their recovery. The ordinary means already indicated were always successful in checking the vomiting and purging. Quinine having become exhausted, arsenical solution was tried as a substitute, but with no sensible benefit.

There were two cases of intermittent fever, presenting severe head symptoms, which require to be noticed more fully. The head symptoms, I believed, had arisen from the strong reflected sun-light within both hospital and barracks. These buildings at Sukkur are situated on rocky heights, where the glare is very oppressive, during almost the whole day. Whether such had been the direct cause of those head symptoms or not, they did not return after precautions had been taken to exclude the sun-light as much as possible from the interior of the hospital and barracks.

The treatment pursued in these two cases was the same. Delirium, dilated pupils, and rapid pulse were present in both. Leeches to the temples (two dozen of leeches proved sufficient), smart purgation by croton oil, and the application two hours after of a blister from a little above the occipital protuberance to the nape of the neck, were the measures employed. Tartar-emetic, which had been given in small quantities to excite nausea,

required soon to be suspended, on account of the physical depression which quickly supervened; then stimulants were given instead. Both of these cases gradually, but at first slowly, recovered.

Acute hepatitis and dysentery, which occurred only among European invalids on their way from Shikarpoor to Kurrachee, presented no peculiarities in character or treatment which have not been already noticed. Only I may observe with regard to acute hepatitis, that I have found that cupping, repeated several times over the margin of the lower ribs, or as near as possible to the seat of pain, acts with decided benefit. Only small quantities of blood (℥ii., in no instance more than ℥ix. at one time) are taken by that means, employed not more than twice; after which dry cupping may be advantageously used, if local pain still continue. I have observed, also, that in the treatment of acute hepatitis it is well to have recourse early to the use of wine.

Of chronic diseases of the liver and spleen there were several cases under my care at Sukkur. In the former class of diseases the ordinary practice was adopted, giving nitro-muriatic acid with or without infusion of chiretta, and keeping the bowels open by means of mercurials or rhubarb. Benefit has resulted, too, from gently affecting the system with mercury. But change of climate, attention to diet, and all the other available hygienic measures are acknowledged to be essential, and much more efficacious in this class of chronic diseases, than any system of medical treatment. But chronic splenitis has always been benefited, and not unfrequently cured, in my experience, by the usual remedies, by frequent blistering over the spleen, or by iodine applied externally likewise; and by the continued use of some ferruginous preparation. Quinine, also, in small doses (2 or 3 grains twice daily), was always given at the same time, even though intermittent fever was not present.

Shikarpoor.—From 5th December 1857 to March 1858.

*Diseases.*—Intermittent fever, dysentery, and hepatitis.

*Troops.*—1st Company Reserve Artillery, Detachments H. M.'s 4th (King's) and H. M.'s 51st Regiments.

Intermittent fever prevailed longer at Shikarpoor last season

than usual. The disease, however, became more mitigated in type, and gradually disappeared, almost completely, under the influence of the cold weather, which appeared to exercise beneficially the twofold effect of invigorating the European constitution, and lessening the power of the malarious poison among both Europeans of the Reserve Company Artillery and Natives attached thereto, who had suffered previously from frequent recurrences of fever. There were a few instances of a very persistent form of the disease, notwithstanding the continued use of quinine, and the tonic regimen by means of iron and wine. This form of fever continued—in two cases particularly, one European and one Native—to recur so frequently as to delay the patient being discharged from Hospital. It was found that removal to the barracks, meantime continuing the use of quinine, benefited these cases very much. One of them, a Native, after recovering from fever, and being considerably improved in health by the partial success of the treatment employed for reducing an enlarged spleen, was subsequently admitted with a severe attack of scorbutus. It presented the usual symptoms, bleeding at the gums and internal hæmorrhage. The treatment employed was successful in checking the disease in a comparatively short time. The measures had recourse to, were the free use of vegetables, and especially of limejuice, along with the tincture of the muriate of iron, and a large quantity of wine. The tincture of iron appeared to act favourably, not only in virtue of its powerful tonic and astringent properties, but also by the part it played in restoring the quality of the blood. This patient, however, lived only six weeks after recovery from this attack of scurvy; intermittent fever, having returned, soon exhausted all his remaining strength. The cases of dysentery and hepatitis which occurred at Shikarpoor within the time above specified have not presented any feature requiring particular notice. In some instances they have been complicated with intermittent fever, but in others not so. The same treatment was pursued as I have already indicated. During all the cold season, to those who have not previously suffered much from intermittent fever, and in particular during the month of March, this station is bracing and healthy.

# ANNUAL REPORT OF THE SICK OF THE ENGINEER DEPARTMENT AT ADEN.

*For the Year* 1856-57.

BY SUB-ASSISTANT SURGEON RUTTONJEE HORMUSJEE.

Presented by the Director General, Medical Department.

The number of men admitted into hospital during the year was 1,751. These, with 150 remaining on the 31st March 1856, form a total of 1,881 (of which number 82 were re-admitted cases), which bears a proportion of 111·6 per cent. to the strength; the average strength during the past year being 1,685. This shows a great diminution in the rate of sickness in the department, when compared with the results of the year 1855-56; for the number of men treated during that year was 3,822, and the annual strength 1,778; the per-centage of sickness was 215. Of 1,881 treated this year there have been 74 deaths. This amount of mortality, although less than in the previous year, might appear to be great; but the causes of this will be evident as the subject is proceeded with. Besides 1,881 men who have passed through the hospital, medical aid has been given to 408 individuals who presented themselves for medicine; such individuals were discharged on the same day, to attend to their duties the next morning. It is customary not to include such cases in the register, and, therefore, they do not appear on the face of these returns. In making a few observations on the diseases treated, I shall observe the following arrangement:—

*Idiopathic Fevers.*—During the year, 474 cases of intermittent fever have been treated, including 28 cases that remained on the 31st March 1856. Of these, two were fatal. Fever chiefly

prevailed during the months of April, May, June, and July, when it was generally of a mild nature, and had no connection with a malarious origin. The chief causes may be said to be exposure to vicissitudes of temperature, to heat and cold and moisture, hard labour, and fatigue. The symptoms were generally of a mild nature. The treatment was commenced with either an emetic or a mild purgative, according to the circumstances of the case. During the intermission, arsenic, in the shape of liq. potassæ arsenitis, with the infusion of chiretta, or the infusion of cinchona bark was given; and generally a cure followed in a short time. Quinine was given in a few cases only in small quantity. Few complications of any importance of any of the internal viscera were noticed. Patients were discharged well about the 4th or 5th day, and often even earlier. Of the two fatal cases under this head, one died from gangrene of the left lung: the other was a weakly man, for some time in the hospital; diarrhœa was the cause of his death.

*Remittent Fever.*—Thirty-four cases of this disease have been admitted, and 21 remained on the 31st March 1856. The total number, therefore, treated, was 55 cases. Of these 13 proved fatal, or in the proportion of 1 fatal to 4·2 treated. Of this number, 6 died in April 1856, at the close of the epidemic of a dynamic remittent fever which then prevailed. The causes which were in operation during the epidemic have already been, on a former occasion, described. In May and June the great heat of the sun acted as a powerfully exciting cause. The symptoms of the disease, and the treatment pursued, have been exactly the same as mentioned in a former report: I need not therefore repeat them here. Of the 13 fatal cases, 5 proved fatal from head symptoms, 1 with head symptoms and pneumonia, 5 with pneumonia, and 3 with bronchitis.

*Diseases of the Lungs.*—Nine cases of acute bronchitis were admitted; these, with 2 from the last year, make a total of 11 cases. The symptoms generally were, some degree of cough, with mucous expectoration; some degree of oppression of the chest, with sibilous and sonorous râles under the stethoscope.

The treatment of the disease consisted in the exhibition of a purgative when necessary, followed by mild sedatives and afterwards expectorants, now and then combined with an anodyne. In cases where pneumonic complication was found to be present, tartar-emetic was given in doses varying from $\frac{1}{8}$th to $\frac{1}{4}$th of a grain, combined with alterative doses of mercury. Quinine was also exhibited in small doses, where febrile symptoms were prominent. Of the three fatal cases, two occurred in the month of April, one in May. They were complicated with fever of a remittent form, but the pulmonic symptoms predominated over the febrile on admission.

*Pneumonia.*—Of this, 11 cases have been treated, including the one which remained on the 31st March 1856. This has all along been a very important disease either when alone or as a complication of fever. The symptoms generally present were shortness and hurridness of breathing, attended with cough; sputa frothy and mucous, sometimes adhesive,—rusty sputa has not been noticed in these cases. There was always more or less fever, but pain in the chest was not a marked symptom. These symptoms being unsatisfactory, the diagnosis was entirely founded upon the stethoscope. The physical signs were crepitous râle in the first stage, and dulness on percussion with bronchial respiration in the second stage. These signs were distinct in all varieties of the disease, and were most marked in the posterior and lower regions of the chest; they became distinct in the upper and anterior regions as the disease advanced. The treatment adopted was local blood-letting, but only tolerated in a few cases, as the disease was generally first seen when little benefit could be expected from the abstraction of blood. At the same time the bowels were acted upon by purgatives, and then tartar-emetic was at once given in doses varying from $\frac{1}{6}$th to $\frac{1}{3}$rd of a grain, according to the circumstances of the case. It was combined with quinine when febrile phenomena were evident, and with mercury and a small dose of opium in sthenic cases during the second stage of the disease. In asthenic cases liquor potassæ with sesquicarbonate of ammonia and camphor mixture was given, and mercury used only as an alterative; but in none was it exhibited to an extent

to bring about symptoms of ptyalism. Counter-irritation was made use of as soon as the febrile symptoms abated. When on admission the symptoms were far advanced, as was the case with at least four of the cases, quinine and stimulants, with counter-irritation, were the chief remedies trusted to; at the same time the diet of the patient was regulated. Of the 11 cases, 5 proved fatal; they were all instances of double pneumonia.

Under *Diseases of Liver* there was but one case of mild hepatitis, and nothing particular requires to be mentioned.

*Diseases of the Stomach and Bowels.*—7 cases of acute dysentery received treatment: of these, one proved fatal. The cases of the disease were of a mild nature, and the symptoms generally present were scanty motions with mucous and blood; they were passed with some degree of griping and straining. Tenderness of the abdomen was not distinct in all cases, and there was no symptomatic fever in any case. The treatment was commenced with a small dose of castor oil, with tincture of hyoscyamus when an abdominal fulness was apparent; and this was followed by Twining's pills of ipecacuanha, gentian, and blue pill; and, as the blood disappeared, and the mucous lessened, they were combined with opium; and generally a rapid cure followed. Fomentation was the only external application used: there was no occasion for a blister. The fatal case under this head occurred from an ulcer, situated over the sacrum, taking on gangrenous action before death.

*Diarrhœa.*—Fifty cases of this disease were admitted, and one was remaining. Of these, one proved fatal. These, like the cases of dysentery, were of a mild nature, and they were in many cases associated with symptoms of indigestion. The treatment consisted at first of a full dose of castor oil, and, after the *primæ viæ* were cleared, astringents and opiates, and last of all tonics, were exhibited; and in a short time a cure followed. The fatal case under this head was first admitted for an ulcer: the man died from chronic diarrhœa, after a long stay in the hospital.

*Obstipatio.*—Two cases of this disease were treated. One

was discharged, cured; the other, although admitted under this head, was in reality a case of an abdominal abscess, as indicated by a *post-mortem* examination. The abscess had caused secondary peritonitis, and the reflections of the peritoneum were in a gangrenous state.

Under this class of diseases, there were also two cases of dyspepsia and three of colic;—they require no particular mention.

*Diseases of the Brain.*—There were three cases of cephalalgia, periodic in character, and benefited by quinine. During the period of the adynamic remittent fever, a patient was admitted with symptoms of epilepsy, but it was really a case of inflammation of the substance of the brain; and before mercurial influence could be developed, the man died. A *post-mortem* examination showed that the anterior extremity of the left hemisphere of the brain was in a softened state.

*Rheumatic Affections.*—Under this class 205 cases, viz. 5 of acute and 194 of chronic rheumatism, and 6 of lumbago, were admitted. These, with 8 remaining cases, formed a total of 213 cases; of which 195 were discharged cured, 17 men were sent away to Bombay, and one died. The symptoms of the chronic form were pains of the joints and limbs, attended with some puffiness of them: in the acute cases there was distinct swelling from effusion into the joints, chiefly the knee and ankle-joints; these were accompanied with mild febrile symptoms. In cases of scorbutic rheumatism, these symptoms were combined with stiffness, hardness, and dark discoloration of the joints and limbs; causing much lameness in walking, and inability for manual exertion. The treatment pursued was, first, a purgative, mild or strong according to the circumstances of the case, followed by a combination of sulphate of magnesia, vinum colchici, and tincture of hyoscyamus. Then a combination of Dover's powder, ipecacuanha wine, and nitric acid was also given. Limejuice from ℥ii. to ℥iii. was daily exhibited; a mild form of counter-irritation was used; liquor lyttæ was slightly brushed over the joints, just sufficient to excite small vesicles, and after these were allowed to dry, the liquor was repeated; but small blistering

was not had recourse to, from the tendency so often exhibited by such blisters to degenerate into foul ulcers, and, in all cases, the good effects of this plan were evident. Strong applications of iodine and mustard were used in the same way. After this, stimulating liniments were employed. The fatal case under this head was one of scorbutic rheumatism.

*Diseases of the Genital Organs.*—10 cases of primary and 3 of secondary syphilis, 5 of bubo simplex, 5 of gonorrhœa, 2 of orchitis, and 2 of phymosis, received treatment, and all were discharged cured, with one exception. In one of these cases the man had taken mercury to salivation in the bazar, and he was brought with urgent symptoms of ptyalism. He was discharged cured.

*Wounds, Injuries, Abscesses, and Ulcers.*—67 cases of abscesses, large and small, acute and chronic, 5 of paronychia, 57 of contused and lacerated wounds, 65 of contusions, 411 of ulcers, 4 cases of sprain, 2 of fracture, 1 of fistula-in-ano, and 1 of fistula-in-perineo, and 4 cases of burns, making in all a total of 617 cases, were admitted. To this, 38 remaining cases of the several affections are to be added, and the sum is 655. It will thus be seen how far these diseases (surgical) amongst the working people employed at Aden, exceed those of the other classes. Of the two cases of fracture, one was a case of compound fracture of the skull, with extensive injuries to the substance and membranes of the brain, caused by an accident. The other was a fracture of the fourth and fifth right ribs, with wounds of the lung, and emphysema on the side of the chest. During the year there were also four cases of burns, three of which were caused by the explosion of gunpowder during blasting, the fourth by the flame; one of the former was a very extensive injury.

*Ulcers.*—In my last Annual Report I offered certain observations on the subject of ulcers, occurring amongst the working people of the Engineer Department. I stated that the general character of these ulcers was sloughy. I then pointed out the causes, pre-disposing and exciting; the common situation at which these sores are met with; their appearance, progress, termination, and treatment: and whilst treating the last part of the

subject, I insisted upon the necessity of constitutional treatment, combined with the mode of local treatment then described. I submitted my opinion that nitric acid, undiluted, offered the best means of checking and destroying the local sloughy action, notwithstanding the averments now and then made against its use in this disease. I have now to mention that these statements, made in my last Annual Report, are thoroughly borne out by the experience of the past year.

During the year 411 cases have been admitted. These, with 27 cases remaining on the 31st March 1856, make up a total of 438; of which 31 died, or in the proportion of one death to every 14·1 cases treated. This shows a great increase in the rate of mortality from ulcers, compared with the results of the year 1855-56; for the ulcer cases then treated being 389, and deaths only 3, the proportion of deaths to treated was as 1 to 129 cases. Of the 31 deaths, 8 occurred during the month of November, 9 in December (besides the two cases of amputations performed for ulcer), and 7 in January; the remaining 7 cases were scattered over the rest of the year. During these months a disease raged in the hospital, similar, in some respects, to hospital gangrene. The outbreak of this disease may be said to have begun in the early part of the month of November 1856. It commenced by a fever, which was not confined to cases of ulcer, but appeared indiscriminately in many of the inmates of the hospital. The average number of sick in the hospital at this time from all diseases, as well as the number of ulcers, abscesses, wounds, contusions, and dracunculus, treated during the three months, with the rate of mortality, and the ratio of deaths to treated, will be seen from the following table; from which it will also be observed that, during the three months alluded to, there was no unusual amount of crowding of the sick from all diseases, nor from cases of ulcers, wounds, contusions, &c. alone. Indeed, it is evident that there was a diminution in these respects, when compared with what occurred in the previous months. Therefore, crowding could not be stated as one of the efficient causes of the outbreak of this disease.

*Statement of the Cases of Ulcers, Wounds, Contusions, Abscesses, and Dracunculus treated in the Hospital during the Year* 1856-57.

| | Months. | Treated. | Died. | Ratio per Cent. of Deaths to treated. | Average daily Number of Sick from all Diseases. |
|---|---|---|---|---|---|
| | 1856. | | | | |
| Hot Weather. | April | 124 | 2 | 1·61 | 113 |
| | May | 163 | 1 | 0·61 | 130 |
| | June | 171 | .. | .. | 106 |
| | July | 193 | 1 | 0·51 | 119 |
| | August | 171 | 1 | 0·58 | 126 |
| | September | 154 | 2 | 1·29 | 126 |
| Cool Weather. | October | 124 | 3 | 2·43 | 113 |
| | November | 85 | 8 | 9·41 | 75 |
| | December | 76 | 11* | 14·47 | 56 |
| | 1857. | | | | |
| | January | 51 | 7 | 13·72 | 39 |
| | February | 46 | .. | .. | 38 |
| | March | 44 | .. | .. | 32 |

The fever alluded to was attributed to a sudden and perceptible change in the weather,—from a hot and dry atmosphere to a cool and moist one,—and from this change, combined with the close proximity of the sea to the hospital, the floor of the wards was always wet in the morning. The construction of the hospital, pointed out in my report of the Engineer Department at the time I received charge, with its old materials, had, I believe, much to do with the outbreak; and from these causes, one and all taken together, the sloughy action—the first seed of the destructive disease—originated.

Thus commenced, the sloughy action continued slowly to increase. An offensive and afterwards highly contagious discharge

* Of the 11 deaths which occurred from ulcers, two were from amputation of the thigh performed for ulcers.

formed from the surface of the ulcers; the putrid particles arising from it mingled with and tainted the atmosphere around. The air thus charged, became itself the means of conducting the seeds of disease from one ulcer to another, independently of any infectious property which it must have acquired during the height of the disease.

*Symptoms.*—In cases where healthy ulcers became bad, the process was commenced by a sloughy spot appearing near the margin. The spot increased gradually, and involved the whole surface. The discharge, previously healthy, now became thin and reddish, and then offensive and highly contagious. As the unhealthy process went on, the connecting areolar tissue was attacked, and if the disease was not checked, the surface of the ulcer, with a thick layer of soft parts, soon became darkish in appearance. Next gangrene set in, and crept along the edges,—the skin on which situation merely looking swollen and tense, somewhat hot, and pitting on pressure. In cases where the ulcer was previously bad, gangrene soon showed itself near the edges, and crept along beneath the surrounding skin: and when the seat of the ulcer was the lower part of the leg, the upper part of the limbs assumed the appearance now described, whilst the lower part at once became coldish and discoloured. As the disease progressed, gangrenous action soon reached the knee; and, before this had taken place, dysentery or diarrhœa made its appearance. This increased the debility, and lowered the already depressed vital powers, after which the patient died perfectly exhausted. In other cases head symptoms made their appearance from the putrid particles, either inhaled from the atmosphere or absorbed from the sore acting upon the nervous matter of the brain. The patient first showed some degree of incoherence; this slowly passed into muttering delirium; coma set in at last, and from this he died.

The attack of the disease was a severe one, and not very amenable to treatment. At the very onset, when sloughy action made its appearance on a healthy sore, it was destroyed by nitric acid; and by this means, combined with the constitutional treat-

ment, healthy action was restored in some cases; but in others the disease went on unchecked in the way described; and in these desperate cases, charcoal poultice was used with the view of leading to separation of the sloughs. Chloride of lime was made use of, both as a wash for the ulcers, and in sprinkling about the wards. Liq. sodæ chlorinatæ and vinegar and water were also used in a similar manner. Quinine, in doses of gr. iv., with opium gr. i., was given three times in the day or oftener. At the same time limejuice to the extent of ℥iv. or more, and arrack from ℥ii. to ℥iv. was also given, with large opiates at bed-time: chicken and vegetables were allowed in due proportion.

The disease, however, did not abate till the 15th December. Fifteen deaths, including two on account of amputation of the thigh, occurred; and there were several men in the hospital in a bad state at the time. Looking upon the disease as hospital gangrene, and also upon the hospital itself, as unfavourable both as regards site and construction, and considering the importance of separating cases of ulcers at such a juncture, as far as practicable, Surgeon Craig, the present Medical Superintendent at this station, fixed upon the expediency of evacuating the hospital; and, in order to do this, an opportunity having presented itself, twenty cases of ulcers, brought to a healthy state previous to embarkation, were sent to Bombay by the Ship "Carpentaria," on the 16th December 1856. All other ulcers which were at the time in a bad state were detained. Of the remaining cases of ulcers, a few of small size were sent to their lines to be there treated; others were put into tents, separating widely the healthy from the unhealthy, and thus the hospital (condemned) was entirely cleared off and left. A few admissions that soon took place from bad ulcers were temporarily placed in the hospital of the 18th Regt. N. I. At the same time, other means were used as regards cleanliness, washing of cots, clothing and bedding; and, by these means, the disease was entirely checked by the end of January 1857.

Having thus referred to the origin, progress, symptoms, treatment, and prevention of this outbreak of the disease above

described, I have a few more remarks to make on the subject of ulcers generally. For the treatment of an ulcer, the patient should be placed in a position where there is a free current of wind; the ground or floor ought to be made and kept as dry as possible, and should be covered by such sand, &c. which, from its chemical composition, possesses no property of attracting or absorbing moisture from the atmosphere; warm, dry weather, with a free current of wind, is more favourable than cold and damp air. During the past hot weather, the verandahs of the wards, facing the sea, were filled with cases of ulcers, and there were others inside the wards of a similar nature, and yet there was then very little mortality, as will be evident from the table already given. On the subject of treating cases of ulcers in tents, from my experience, short as it is, I can speak very highly indeed. Tents afford easy means of controlling the direction of the wind, and of separating the cases themselves, as far as could be wished: they can also be moved to any desirable piece of ground.

*Diseases of the Eye.*—Under this class, 29 cases of ophthalmia and 3 of nyctalopia were treated. Of the former, some were instances of simple conjunctivitis; in others a degree of sclerotitis was combined; two were instances of gonorrhœal opthalmia affecting both eyes; and two cases were admitted with a wound of the cornea, caused by a small stone striking the eye. The causes were, in some instances, of a mechanical nature, a small piece of stone hurting the eye, as already mentioned, or a particle of dust or sand getting into it. In others, the disease was attributed to cold, combined with deranged state of general health; in others again, exposure to the glare of the sun was stated to be the cause. The treatment adopted was local blood-letting, much or little according to the severity of each particular case; purgatives with cologagurs; fomentations were also used. Nitrate of silver solution was dropped into the eye, the strength varying from gr. ii. to gr. x. to ℥i. In some cases, calomel and opium were given just to touch the gums. With the exception of the two cases of wound of the cornea, in which vision was lost, all were discharged cured.

*Diseases of the Skin.*—20 cases of scabies were treated and discharged cured, and one remains. One case of well-marked syphilitic psoriasis was sent to Bombay. The man's constitution was unequal to his duties.

*Other Diseases.*—There were 6 cases of amputation; 2 of the thigh, for sloughing ulcers on the leg; they were had recourse to as a last resource, and, as was expected, they proved fatal from exhaustion, sloughing setting up in the stump. The other amputations were minor ones, of fingers and toes.

There were also 71 cases of general debility treated during the year. Of these 3 died, 52 were discharged cured, 15 sent to Bombay, and 1 remains. 14 cases of anæmic and structural disease of the heart also received treatment: of these 4 died.

*Dracunculus.*—Of this affection 84 cases were treated during the year. It was, in many instances, a tedious affection. Its relation to ulcer has been, on a former occasion, pointed out. 81 cases have been discharged cured, 2 died (from ulcer), and 1 was sent to Bombay for the same reason.

The only disease which remains now to be mentioned is *Scurvy*. Of this 105 cases were admitted, and 6 remained from the last year. The symptoms were generally of a mild nature, and the treatment followed was exactly the same as described in my last Annual Report. Of the 111 cases, 107 were discharged cured, 2 sent to Bombay, 1 died, and 1 remains.

*Midwifery.*—A case of transverse presentation with protrusion of an arm and the placenta attached to the mouth of the uterus required the operation of turning. The mother recovered; the child was still-born.

*Vaccination.*—During the year 99 children of the biggaries have been vaccinated by the Government Vaccinator.

*General Observations.*—Having been now more than two years in the department, I beg to offer some observations regarding a few points; and first of all I shall state the general character of the work-people employed on the public works at Aden. They belong to the poorest classes, gathered up in all manner of ways from the bazars of Bombay; are very irregular in their habits

and manners; full of prejudices and superstitions of every kind; a large portion of them appear to be very far from adhering to the truth, and not a few are inclined to be idle, and feign sickness; and when sick, they present themselves late for medical treatment. They are, however, generally obedient to their superiors. Most of them are addicted to the use of spirituous drinks, and to smoking tobacco. A few smoke ganja, and make use of opium.

I would next advert to the system pursued in sending men away to Bombay on sick certificate. During the year, 100 men were so sent away from Aden; this being in the proportion of 5·9 per cent. to the strength, which per-centage is less than in the year 1855-56, for the men then sent away were 144, and the average yearly strength 1,778, or a per-centage of 8·1. Bearing in mind how expensive it is to the State to send men away from here, and especially when they have not served much of their stipulated time (three years), nor repaid the cost borne by Government, and that substitutes from Bombay have to be found, it has been an incumbent duty with me to use much discretion on this point; but, at the same time, I beg permission to state, that no man is allowed to remain here who, from his state of health or depressed physical powers, was found to be unequal to his duties; indeed, his presence here would be a burden to the State. On the subject of sending cases of ulcer to the Presidency much has been, I believe, written by Dr. Craig, the present Medical Superintendent at this station, whose views, to state briefly, are, that it is improper to embark cases of ulcers in a sloughy state; for, strong as the tendency always is for an healthy ulcer to become an unhealthy one, the presence of one sloughy ulcer would, during the long voyage, lead to deterioration of the rest, and thus frustrate the object for which such cases are embarked for the Presidency. The usual routine practice, prevalent, I believe, ever since the Engineer Department was established at Aden, was, that, whenever a passage could be procured, cases of ulcers, both healthy and unhealthy (but not moribund ones), were deported, which cases could not, if the ulcers healed at Aden, prove of effectual after-service, from contractions,

stiffness, and consequent lameness of limbs. The present practice, as established by Surgeon Craig, consists merely in sending men with healthy ulcers such as would really derive benefit from a change of air, detaining all others, either to make the most of them at Aden, and thus to avoid the cruelty to which such patients must be subjected on the voyage, or to be subsequently sent to the Presidency. Agreeably with these humane views, the men embarked on board the ship "Carpentaria" on the 16th December 1856 were treated, and the result was, that, out of 25 men, only 1 died on the voyage. Of these 11 men who were detained on the last mentioned occasion, 7 died at Aden, 2 in December and 5 in January, and 4 men recovered.

I have next to advert to a circumstance which I brought to the notice of the Medical Board on my assuming charge of the department, in a Report dated 28th June 1855,—I allude to the strange system which prevailed some time ago, of some of the sick men leaving the hospital without permission, and going to their lines to take their food. I stated, "I mean the practice amongst the sick men of going to their lines every day with the view to take food, and they do this generally at about 11 o'clock in the morning, and return to the hospital in the afternoon; this involves a walk of three miles, and that at the worst part of the day. That this system must be an injurious one, there can be no doubt." Being deeply impressed with the fact of the prejudicial influence which this practice must necessarily have on sick men, I frequently conversed on the subject with the Medical Superintendent and Executive Engineer. At length, the latter officer obtained permission of the Brigadier in January 1856 to punish any party I might represent to have been absent without permission. By this means the evil practice was instantly done away with, and is no longer heard of. At the onset a system of fining or deduction from their monthly pay was tried, but without any good effect.

And now I have a few words to say on the plan of weekly inspection of the whole body of working people. This system was first established, with much trouble, by Dr. Steinhauser when he had charge of the department; and, ever since, the examina-

tions have been regularly carried on by me. This regulation is a most judicious one; it affords an opportunity to the medical officer in charge to take an insight into the health of the men, liable, as they are, to the development of scurvy and to serious disease. In proof of the usefulness of this practice of frequently examining the working-people, I would state that—scurvy then being a scourge amongst the operatives at Aden—limejuice with sugar was issued by the Executive Engineer at Dr. Steinhauser's recommendation, as a prophylactic measure to the whole body of working-people, during, and little before the hot weather of 1854 and again of 1855. Since this, however, the inspection system being established, cases of scurvy, as they presented themselves, were directly taken to the hospital, and there treated, and no such prophylactic measure was necessary in the year 1856, nor in this year.

As regards the present state of health of the biggaries, they are and have been for some time past free from scurvy, although there were 925 men treated on an average every month out of a body of 1,685. The strength of the department as it stands this day, is about 1,342, a considerable reduction, from about 2,075 men on 31st March 1856. The reduction has taken place from men having gone to the Mauritius and to Persia; several have taken their discharge, 74 died, and 100 men were sent to Bombay on sick certificate. It remains now to be mentioned that, whenever a body of labourers are sent to Aden from Bombay, it behoves the authorities to have the men thoroughly inspected before they are embarked; and on this subject it is hoped that enough has been said by the Medical Superintendent and the Executive Engineer, and by myself on a former occasion.

*Statement of the Sick of the Engineer Department in the Military Native General Hospital, for the Year ending the* 31*st March* 1857.

*Aden,* 1*st April* 1857.

| | Treated. | Died. |
|---|---|---|
| Fevers | 529 | 15 |
| Diseases of the Lungs | 22 | 8 |
| Diseases of the Liver | 1 | .. |
| Diseases of the Stomach and Bowels | 70 | 3 |
| Diseases of the Brain | 2 | 1 |
| Dropsies | 218 | 1 |
| Venereal Affections | 96 | .. |
| Abscesses and Ulcers | 445 | 31 |
| Wounds and Injuries | 142 | 2 |
| Diseases of the Eye | 32 | .. |
| „ Skin | 21 | .. |
| Other Diseases | 303 | 13 |
| Total.... | 1,881 | 74 |

# ANNUAL REPORT OF THE 10TH REGIMENT N. I.

## *For the Year* 1857-58.

BY ASSISTANT SURGEON T. MURRAY.

Presented by the Director General, Medical Department.

The Head Quarters of the 10th Regiment N. I. were stationed at Bombay during the greater part of the past year, having reached the Presidency from Nusseerabad on the 10th April 1857, with the view of proceeding on service to Persia; which arrangement the conclusion of peace prevented being carried out. From the emergencies of the public service, the corps has had heavy duty, and has been much employed on detached duties. It furnished in October a detachment for escort duty to Persia, in the transport *Result*. After this, the right wing, on the 23rd November, proceeded on field service, with a wing of H. M.'s 95th Regiment, and a company of the Royal Engineers; and shortly afterwards two companies were suddenly ordered to the disturbed districts near Nassick. Eventually, the head quarters and left wing were warned for service in Rajpootana; and accordingly, on the 2nd February, proceeded in the Steamer *Prince Arthur* to Mandavie, where they arrived on the 7th; and marched on to Bhooj, and there joined H. M.'s 8th Hussars. The field detachments then continued to progress through Deesa to Rajpootana, by long and occasionally fatiguing marches; and on reaching Jehaypore, received intimation from the authorities that it should join the force proceeding to attack Kotah with the least practicable delay. It accordingly pushed on, and reached that city as the assembling columns were forming to cross the Chumbul. The right wing 10th N. I., having been detailed with H. M.'s 95th Regiment as one of the columns to storm the city, proceeded to the Rajah Fort, on the morning of

the 30th March, and performed the duty assigned to it in a very gallant manner, and with a comparatively trifling loss; the whole casualties in the right wing during the operations at Kotah amounting only to 1 killed by cannon shot, 5 killed by explosion of the enemy's magazine, and 5 wounded in the assault,—of which 2 were by round shot, 2 by splinters, and 1 by sword-cut in a hand-to-hand encounter.

In consequence of the separation of the corps into wings, and its further dispersion in detachments, the regiment has only been about two months under my personal observation, which renders it somewhat difficult for me to furnish a complete account of its medical history. The past year has been an eventful one in the regiment, as well indeed as in the history of the country, the corps not having entirely escaped the contamination of the ill-disposed at the Presidency; the extent of which, however, has fortunately proved to have been limited, having evidently been confined to a certain class. Be that, however, as it may, the prompt and energetic course adopted by the authorities for arresting its further progress was attended with the best results, and the spark of disaffection was at once effectually extinguished. The effect of these decided measures has been very salutary, and the corps has since steadily endeavoured to redeem its good name by its zeal and gallantry in the field. The behaviour of the right wing in the attack on Rowah, at the siege of Awah, and Kotah, has certainly afforded great ground for satisfaction; and in the first-mentioned affair, has even elicited the commendation of His Excellency the Commander in Chief. The conduct of the head quarters and left wing has also been satisfactory, having had unusually heavy duty entailed on them by the detention of two effective companies at Peynt by the political authorities there, and by the detachment of another company at Bhooj, to await the arrival of a company of Royal Artillery expected from England. This great reduction of the numerical strength, with a succession of long and occasionally forced marches, with few halts, has tried the physical power of the men severely; but they have throughout shown the best spirit, enduring fatigue, privation, and exposure with cheerfulness, and marched in a manner that called forth the remark of their Euro-

pean comrades. On starting from Mandavie, the number of tents was found insufficient for the accommodation of the men; and the hospital tent issued was one that had been used in the Crimea, and was entirely unsuited to the regiments of this climate. It was therefore returned into store at Bhooj; and a 3rd class European hospital tent obtained instead. The men, while on the march, on the whole enjoyed good health. The principal sources of admission were from fevers of low adynamic type, with well-marked thoracic complication in many instances: injuries and ulcers also kept a number on the sick list. A case of variola occurred in a European officer at the commencement of the march, and one of varicella in a recruit.

The medical history of the regiment presents little for special remark, beyond what has been already noticed in my former reports. There has been a large number on the sick list, but the mortality has been comparatively small. During the period under review, out of 1,280 admissions, 8 deaths occurred in hospital. The porportion of sick to strength has amounted to 158·2; and the ratio of deaths to strength, 9·6; and to treated, 6·0. The defective site and drainage of the regimental lines at the Presidency have been previously reported on, and there remains little to add, excepting that further experience of the locality confirmed the unfavorable opinion then submitted. The defective sanatory arrangements at Bombay, however, are too well known to require allusion to; indeed, the quantity of filth in the Native Town is absolutely incredible, and it is surprising that it occasions so little sickness. During a certain portion of the year, loss of appetite and even nausea are occasioned by the tainted state of the atmosphere, which, in my short experience there, was found to cause a disposition in diarrhœal attacks to assume a choleraic character if not promptly treated. It may not unreasonably be inferred, that the location of a native regiment at Bombay is apt to produce an unfavorable influence on its condition, from the position of the lines, the nature of the duties, and the temptations to which the men are exposed.

The principal diseases have been fevers, affections of the lungs, affections of the bowels, and rheumatism.

*Fever.*—Fever has constituted upwards of one-fourth of the whole admissions: of these, there were 124 ephemeral, 253 quotidian, 9 tertian intermittent, and 4 remittent; amounting in all to 390 cases from this class of disease. Intermittent fever is too well known to require me to offer any remarks on it, excepting to indicate the frequency of thoracic complication in the period referred to. Quinine is unquestionably the most certain remedy; but its use does not altogether supersede the necessity of other measures, where local complications arise in important organs. In the common slight attack, cinchona or chiretta, with one of the mineral acids, or arsenical solution, often suffice to check its progress; but occasionally cases seemingly ephemeral occur, in which these remedies produce little effect, when quinine or a combination of it and sulphate of iron, and sulphuric acid have to be resorted to. Before ascending the high land of Mewar, fevers had begun to assume an unusually low type; from endemic causes, and in some degree from fatigue and exposure. This was especially noticed before the ascent of the Khattacklory Ghaut, and afterwards at Bheelwarra. The same type of disease, I believe, showed itself in the hospital of H. M.'s 8th Hussars. The affection commenced with the usual symptoms of intermittent fever, which soon presented a low typhoid character, with pulmonary congestion,—suffused conjunctivæ,—dry, brown, glazed, fissured tongue,—great prostration of strength,—enlargement of parotid and submaxillary glands,—and, in one instance, discharge of blood from the nose and lungs. This adynamic condition was relieved by cold affusion to the head, diffusible stimulants—brandy with sago given at regular intervals,—quinine, sulphuric acid, and camphor; and in less severe cases nitrate of potash, spirit. ether. nitrici, liquor ammoniæ acetatis in infusion of cinchona, with dry cupping to the chest, and turpentine epithems and sinapisms. In one case, in which hæmoptysis occurred, turpentine with quinine and camphor was exhibited, and fully answered my expectations. The principle indicated in these typhoid remittents, for such they become, was to check the exacerbation, and then to guide the patient through the attack, preserving the strength as much as possible, and preventing congestion running into inflammation, or leading to organic

morbid change. Since the corps has been in Mewar, a number of cases of intermittent or ephemeral fever has been met with, associated with enlargement of the parotid, submaxillary, and cervical glands.

*Diseases of the Lungs.*—Of these, the bronchitic catarrhal was the most common form. Two cases of pneumonia, 1 pleuritis, and 2 phthisis were met with. One of the last-mentioned was granted sick leave to his country, but did not derive much benefit from visiting his home. In the case of pleuritis, venesection was had recourse to, in order to relieve the urgency of the symptoms. This was nearly the only instance in which bleeding from the arm was required during the last seven months.

*Diseases of the Stomach and Bowels* have been pretty frequent, but the only cases under my observation have been from diarrhœa or cholera, in which the symptoms presented a severe character. The former disease was found to have a disposition to pass into the latter after the monsoon.

*Cholera.*—The admissions from this malady were in October and November. Previous to the occurrence of the first three cases, the weather had been sultry and oppressive, and the temperature had continued high after the cessation of the rains. Two of these cases were seized in the lines at night, and the other in the forenoon, when a patient in hospital. The first was a well developed case, and was treated with calomel, camphor, and opium, in the form of pill, followed by a draught of chloroform, spirit ammonia arom. in camphor mixture, repeated every second hour, turpentine epithems and a sinapism to epigastrium, with wine and arrowroot. As the dejections retained their choleraic character on the following day, and presented numerous mucous flocculi, a combination of tinct. catechu, cardam., chloroform, and camphor was prescribed, and wine and arrowroot continued, which succeeded in arresting the disease. The second case occurred in a weakly patient, who had been under treatment for intermittent fever, and was sudden and severe, the pulse having nearly ceased at the wrist in the course of half an hour, and the breathing become laboured and difficult. This condition was relieved by dashing the face with cold water, and by the persevering use of chloroform, by ammonia and brandy every half,

and then every second hour, with the continued administration of wine and sago. The third case was of a milder character, and was treated by a modification of these measures. The last instance occurred in November, and was met by the exhibition of chloroform, catechu, cardam., and camphor internally, at first every quarter and then every half hour. On the following day he was considerably improved, but as the urine continued to be still suppressed, he took a diuretic mixture of nitric ether and nitrate of potash; and the urine was passed scantily, thick, darkish, yellow, alkaline specific gravity 1030, uncoagulable, and free from epithetial deposits.

*Rheumatism* has rarely been of an acute character. In the most severe, it has been sub-acute, but in the generality it has presented the chronic form, with an asthenic state of the system, associated in several instances with a syphilitic taint or scorbutic diathesis. This required a combination of tonics, cinchona or chiretta with nitrate or iodide of potass, or lime juice according to the diathesis. With these measures, fomentations were used locally, and cotton bandaging, and a more generous diet.

*Syphilis.*—Venereal affections were not of great frequency for a regiment stationed at the Presidency. At the commencement of the cold weather, several severe cases of constitutional syphilis were met with, but they gradually yielded to remedial measures, and eventually recovered, excepting one case of syphilitic cachexy which terminated fatally.

*Dropsy.*—Only one case of the disease presented itself, and it arose from renal affection.

*Disease of the Brain.*—Under this head, only three cases require to be alluded to. The first of hemiplegia occurred in a private who had mercurialised himself for syphilis, from which he had long suffered, and was from his previous history ascribed to vital exhaustion from venereal excesses. It was accordingly treated with tincture of the muriate of iron, and cantharides, but with little benefit. Strychnia was then resorted to, but it was found to be productive of only temporary benefit. The second was one of insanity, in which it was found difficult to accurately discriminate between real imbecility and exaggerations. As he made slow progress in the regimental hospital, and as there were

some peculiar circumstances connected with his case, he was transferred to the lunatic asylum, where, in all likelihood, he will eventually become a confirmed imbecile. The third was one of epilepsy in a recruit, who, some time after enlistment, was found to be epileptic. His name was accordingly forwarded for discharge.

*Accidents and Injuries.*—The most important case was one of fracture of the parietal bone with depression, which had been received in an affray with the police, between whom and the men of the regiment there had long existed a misunderstanding, which had originated some years previously from some petty dispute regarding a well. The man has a permanent depression at the seat of injury, but has completely recovered; and has, since his discharge from the sick list, been performing his duty in the ranks.

*Gunshot Wounds.*—It may perhaps be expected that some short notice should be taken of the first occasion on which the 10th N. I. had an opportunity of distinguishing itself. At the requisition of the political authorities, a detachment, composed as marginally noted, under the command of Col. Raines, H. M.'s 95th Regiment, marched on Rowah on the 7th January 1858. On the advanced guard coming in front of the village, the enemy commenced a fire of matchlocks and jingells. The artillery was immediately formed up, and opened fire at 350 yards, the 95th was extended as skirmishers at the sides of the guns, and the 10th N. I. was drawn up in line on the left, with the cavalry and sappers in the rear. The village was built on the face of a hill in an angle; its flanks protected by large rocks and thick jungle, and its front by a wall of mud rivetted with stones and loopholed, and by a ditch and double hedge of thorns. The artillery fire having been kept up for about an hour without producing any apparent effect, a company of the 10th N. I. was ordered to skirmish to within 40 yards of the hedge, supported by the rest of the men; and on the advance being sounded to close up and charge, which was done very steadily in the face of a sharp well-directed volley, Captain Macgowan scrambled through the thorns up a steep rock, and was immediately followed by the remainder of his men, who, after a struggle, succeeded in driving

2 Guns Aitken's Battery.
30 2nd Regt. L. Cavalry.
20 Royal Engineers.
100 H.M.'s 95th Regiment.
200 10th Regiment N. I.

the enemy before them. As the rebels, however, continued to keep up a fire from the rocks and neighbouring jungle, the 10th N. I. was extended along the face of the hill; and while pressing on ahead of his men, the officer commanding was severely wounded in a personal encounter with one of the enemy. After the "retire" had been sounded, and the 10th N. I. withdrawn, the sappers were ordered to blow up the defences, and on proceeding to do so, were attacked by the enemy, and their commanding officer was severely wounded. The right wing was again pushed forward, and the place was retaken and blown up. The casualties during this attack were 1 gunner artillery (wounded) and 2 horses, 3 privates 95th Regiment, and 9 of the 10th N. I., of whom 2 were mortally, 4 severely, and 3 slightly.

The detachment on the 9th January marched on Awah, the Thakoor of which place was in open rebellion against Government, and arrived there on the 19th January, and joined a force from Nusseerabad, under the command of Colonel Holmes, 12th Regiment N. I. The place was a strong one naturally, and had a citadel and 12 guns in stone bastions; and was defended by about 2,000 men and 50 mutineers of the Joudpore legion. The fort was immediately invested; and after three days' shelling, a practicable breach was made, which was to have been stormed on the following morning; but the enemy, taking advantage of a dark stormy night, contrived to effect their escape, with the loss of only 18 men. They were, however, pursued by the Scinde Horse next day, and 100 captured, of whom 24, having been found to be mutineers, were shot by the authorities.

150 H. M.'s 83rd Regiment.
150 12th Regiment N. I.
2 Guns.
500 Scinde Horse.
Detachment 1st Lancers.

The next occasion on which the corps was engaged was at the siege and storming of Kotah, where the right wing was again associated with H. M.'s 95th Regiment, and acquitted itself very satisfactorily. The loss sustained at Kotah has already been mentioned at the commencement of this report, but that of the two former occasions may be here more concisely stated. At Rowah, three European commissioned Officers wounded by musketry, one very severely (having right fore-arm shattered) and two slightly; one European conductor also, who accompanied

the regiment into action, was severely wounded. Of the non-commissioned ranks, one was mortally wounded in the abdomen; one dangerously in the chest; one severely through the superior maxillary bones; one severely through the arm; one sword-cut across the forehead. At Awah two men were wounded in the trenches, one severely in the arm, and the other slightly in the chest.

*Exanthematous Diseases.*—These have been fortunately of rare occurrence, and have consisted of one case of "variola" in an European officer, who contracted the disease at Bombay, five of "varicella," and one of "rubeola." Vaccination has been constantly kept in view, and carried out as far as practicable. Only 61 cases, however, have been vaccinated during last cold season, from the men feeling averse to having the operation performed amongst their families when about to send them home, while the corps proceeded on field service.

*Annual Return of Sick of the 10th Regiment N. I., for the Year 1857-58.*

STRENGTH 829. *Camp Kota, 1st April* 1858.

| | Treated. | Died. |
|---|---|---|
| Fevers | 405 | 2 |
| Eruptive Fevers | 7 | ... |
| Diseases of the Lungs | 60 | 1 |
| Diseases of the Liver | 6 | 2 |
| Diseases of the Stomach and Bowels | 192 | ... |
| Diseases of the Brain | 10 | ... |
| Dropsies | 1 | ... |
| Rheumatic Affections | 72 | ... |
| Venereal Affections | 78 | 1 |
| Abscesses and Ulcers | 195 | ... |
| Wounds and Injuries | 155 | 1 |
| Diseases of Eye | 11 | ... |
| „ of the Skin | 53 | ... |
| Other Diseases | 67 | 1 |
| Total | 1312 | 8 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 158·2 |
| Ditto of deaths to ditto | 0·9 |
| Ditto of ditto to treated | 9·6 |
| Daily average number of sick | 42·5 |

# ANNUAL REPORT OF THE 10TH REGIMENT N. I.

## *For the Year* 1858-59.

BY ASSISTANT SURGEON T. MURRAY.

Presented by the Director General, Medical Department.

After the fall of Kotah, the brigade to which the 10th N. I. belonged crossed the Chumbul, and encamped near the Residency, during the sitting of a commission to investigate certain circumstances connected with the death of the late Major Burton and his sons. It was also detained by the detachment of a party in pursuit of the garrison, which, though it brought back the guns taken away by the rebels, did not succeed in coming up with the enemy. In consequence of this, and in order to clear the flank of Major General Sir Hugh Rose, the 3rd Brigade Rajpootana Field Force was formed, and was placed under the command of Brigadier Smith. It was composed of 3rd Troop Horse Brigade, H. M.'s 8th Hussars, 1st Lancers, H. M.'s 95th Regiment, and 10th Regiment N. I. The column proceeded to the east by Intraputton, Asnarvan, and Barode; and in the first week of May marched through a difficult jungle country on Padoon, the residence of Rajah Maun Sing of Nimour; but he, together with the whole of the garrison, escaped on the night previous to our arrival. Part of the fortifications were blown up, and the force then returned to Goonah, from which the column marched on Chandairee, which had been re-occupied by the rebels, and arrived there on the 26th May. Preparations were made for storming it on the following morning; but the enemy, after keeping up a brisk fire from a large gun and some wall-pieces on the reconnoitring party and advanced picquet, contrived to escape in the night; and when the troops entered the fort on the following morning, it was found completely deserted. In consequence

April.

May.

of the rapid progress of the Calpee rebels in the Gwalior territory, the brigade was ordered to Gwalior, and proceeded by Kolarus and Seepree; and on reaching Kotah-ke-Serai on the 17th June, found that the enemy was in force on a line of heights in front of the encamping ground. An immediate attack was accordingly decided on, and was continued throughout the day, and terminated by the rebels being defeated with considerable loss, and by the brigade bivouacking on ground occupied by the enemy in the morning. The following day was passed in preparing for an advance, and in occupying the enemy's attention by replying to their batteries on the opposite height, which continued to keep up an annoying fire into camp during the whole day. On the 19th June, the necessary arrangements having been completed, the force moved out across the deep canal, and attacked the enemy on the heights, when battery after battery was stormed, the first by the H. M.'s 86th and 95th Regiments, the last by the 10th Regiment N. I., which also captured the principal arsenal. The lines and city were then occupied, and the fort fell into our possession on the following day. The brigade now proceeded to Seepree, and reached that place on the 8th July. It had to halt there in consequence of heavy rains having set in, rendering the roads impassable for artillery. After a sojourn of little more than three weeks there, the brigade quitted it for Powree, a strong fort in the neighbourhood, which had surrendered to Rajah Maun Sing with a body of the Gwalior Contingent. The brigade reached Powree on the afternoon of the 5th August, and bivouacked in front of the fort: but on the following day changed ground, after an ineffectual attempt had been made to induce Maun Sing to come to terms. On the arrival of Brigadier General Napier from Gwalior with a siege train, the place was formally invested on the 20th August; but on the completion of a breaching battery, and after two nights continued shelling, the garrison, despairing of withstanding an assault, escaped during the night by a jungle in the rear of the fort. Throughout the remainder of the month the corps was actively engaged in pursuit, and had to encounter many privations, and much exposure

June.

July.

August.

to the inclemency of the weather with insufficient clothing,—the men having little more than they could carry, the officers being similarly situated, and living in servants' rowties. For some days indeed after leaving Seepree, the whole force was without tents, and had to bivouac. In the beginning of September, the pursuing column under Colonel Robertson traversed a very difficult country without roads through dense jungle, and at length met with success,—the advanced party coming up with a body of insurgents at Beejapoore, and killing 450 of them. In this sharp encounter, the 10th Regiment N. I. had two privates killed, and one mortally and three severely wounded. The column then returned to Goonah, and encamped there until the 19th September, when it was ordered to the south; but on reaching Ragooghur, and finding that the enemy had gone more to the east, was recalled to Goonah, and there rejoined the 3rd Brigade, Rajpootana Field Force, on the 24th September, and on the following day proceeded into the neighbouring districts. The weather at this time had again become wet, and not very suitable for field operations; and when halted at Goonah, a case of cholera occurred, which, however, terminated favourably. While *en route* to Nyaserai, it was ascertained that the rebels were at Esaughur. After obtaining possession of the fort, however, they speedily evacuated it, on hearing of the approach of the brigade, taking with them the best guns; but as measures had been concerted for a combined movement, they were not here vigorously followed up, and accordingly succeeded in crossing the Betwa, after an ineffectual attempt to gain an entrance into Chandairee. The column left Esaughur on the 10th October, and passed to the south of Chandairee to the Ghauts on the Betwa, and after observing them was ordered back to Chandairee, from which the brigade was suddenly summoned to the south, and marched to Barassa, a distance of fifty miles, in two days. From this it moved in a westerly direction to Seronge, and then to the N. E.; and on receiving intimation of the presence of a strong body of rebels in the district plundering and burning villages, the brigade started before day-break on the 13th November, marched throughout the day, and halted at night, when

September.

October.

November.

darkness set in, to bivouac, and early next morning recommenced the march and came in sight of a body of insurgents 2,000 strong, under Maun Sing, near the village of Koondrye. The force was formed up, the Artillery in the centre, with H. M.'s 95th Regiment and a detachment 1st Lancers on right flank, and 10th Regiment N. I. and 8th Hussars on left flank. The artillery moved rapidly to the front and opened fire on the masses as they were preparing to renew the march, while the 10th Regiment N. I. and 8th Hussars pressed them closely on the left, and soon overcame all opposition. The enemy's cavalry fled precipitately at the commencement of the action, so that the loss fell entirely on the Infantry, of whom it is estimated about 500 fell, and with but trifling loss on our side from the suddenness and celerity of the attack. In the 10th Regiment N. I., which, with the 8th Hussars, was the principle corps engaged, only three men were wounded. From this, the brigade marched

December. on Moongowlee which was threatened by the rebels from the other side of the Betwa; and on being relieved by a detachment of the Gwalior Division under Colonel Scudamore, proceeded to the south to Seronge, and from that place made a night march of twenty-four miles to intercept Feroze Shah, who, while *en route* to join Adul Mahomed and Maun Sing, had come upon some stores of the 1st Lancers, killing one man, wounding another, and capturing a number of camels. From defective intelligence, however, the brigade did not reach the rebels, though it encamped within twelve miles of them, but returned to Seronge, and thence marched on Bursud; at which place, on the 30th December, it was directed to

January, 1859. commence the pursuit of the main body of rebels under Tantia Topee and Feroze-Shah, and continued to follow them up by forced marches until they were driven across the Chumbul, when the pursuit was taken up by fresh brigades from Agra and Nusseerabad, with Infantry

February. mounted on camels. The brigade after leaving Indraghur moved in a N. W. direction to Tonk, and halted there until orders were received to proceed to Boondee and Kotah, and thence to Chupra and Bursud. At this place, the brigade halted, and was engaged in patrolling the neighbour-

ing jungles, while negotiations were opened with Maun Sing, and terms forwarded to the Row and his party. As these were not accepted by the latter, the brigade proceeded to Muxoodnughur, a fort in the Seronge jungle, in the neighbourhood of which the rebels were concealed. The principal portion of the brigade now made a detour by a path through the jungles and hills, and obtained a glimpse of the enemy who suddenly disappeared and were lost in dense jungle, while the Head Quarters of the Regiments and two guns marched by the direct road to Goonjam, followed by the baggage of the brigade, which, when within two miles of camp, was attacked by a party of rebels who fell on the sick carts and severely wounded two men, and barbarously murdered the band master of the 10th Regiment N. I. The insurgents here seemed to be fully aware of the whole of the movements of the column: however, on the night of the 4th, a detachment, 350 strong, started after dark, leaving the tents standing, and proceeded through a thick jungle to Boarduh, twenty-four miles distant, and at day-light surprised and dispersed the rebels under Feroze-Shah with the loss of 300 killed. The fugitives were met by a detachment under Colonel Rich, 71st Highlanders, and had about 100 more of their number slain after an obstinate resistance in a village in which they took refuge.

March.

From the above abstract of the employment of the corps during the year, it will be seen that the 10th Regiment N. I. has been continually in the field for upwards of fourteen months, has marched upwards of (2,500) two thousand five hundred miles, and has been exposed to intense heat, cold, damp, malaria, with insufficient clothing, and frequently with scanty unsuitable food, in addition to want of proper rest. Indeed, excepting during the brief sojourn during the rains at Seepree for a little more than three weeks, the corps has never been certain of remaining stationary at one place for more than three days. The duties have pressed heavily on the men; the whole of the day guards of the brigade, and a large portion of the night picquets, have, throughout the campaign, been furnished by the 10th Regiment N. I., with the view of preserving the Europeans as much as possible. This long continued overwork, and the vicissitudes

of field service, have told on all; but more particularly on the older than on the younger portion of the Regiment, whose constitution retained more vigour and elasticity. Upon the former, it has shown itself by a prematurely aged appearance, careworn expression, shortness of breath, and inability to undergo any sudden long-continued exertion; and though the corps has borne up steadily under such protracted fatigue and privation, its exhausting influence will have laid seeds of future disease, and will lead eventually to many being invalided. By the appended table of the different castes and countries of the men, it will be perceived that the majority of the Regiment consists of young men, and that a large portion, nearly one-half of the corps, is of Mahratta origin. The men of this persuasion more readily adapt themselves to the hardships incidental to field service than the higher brahminical caste, whose usages as to cooking and eating at a certain time cannot frequently be accommodated. The result is, that men of that persuasion are apt to suffer more than others from the deprivation of a cooked meal daily, and are liable, during long continued operations in the field, to become cachectic and broken down in constitution. That this effect has not been over-estimated will be admitted, when it is known that the whole Regiment even has marched without food for two days, and that the rear-guard has been out for four days, during which they had to content themselves with any scanty meal they could procure.

*Statement showing the respective Castes of the Men of the 10th Regiment N. I.*

| | |
|---|---|
| Christians | 2 |
| Jews | 8 |
| Mussulmen | 100 |
| Mahrattas | 461 |
| Other Castes including Bramins 37, Chuttries 45 | 215 |
| Purwarees | 185 |
| Total | 971 |

*The respective Countries of the above.*

| | |
|---|---|
| Northern Konkan | 15 |
| Southern Konkan | 461 |
| Deccan | 194 |
| Guzerat | 2 |
| Hindoostan | 230 |
| Punjaub | 10 |
| Deccan, Hydrabad | 2 |
| Madras | 57 |
| Total | 971 |

*Length of Service of the Men of the Regiment.*

| | |
|---|---|
| Under 5 years | 458 |
| From 5 to 10 | 65 |
| „ 10 to 15 | 143 |
| „ 15 to 20 | 238 |
| „ 20 to 25 | 59 |
| „ 25 to 30 | 8 |
| Total | 971 |

The diseases during the period under review have been generally of an asthenic character, as might be inferred from the circumstances of the employment of the Regiment. The prevailing diseases have been fever of a periodic form, which was more or less modified by the seasons and districts in which the affection was contracted. The corps has providentially remained free from epidemic disease, only one case of cholera having occurred during the year. The comparative exemption from sickness has been in some measure owing to the favourableness of the season to the excitement of field service, and success of the corps, and to the regular habits necessarily observed, rendering dissipation or irregularity incompatible with marching day after day. To this cause, *en passant*, may be attributed the mildness of venereal disease, which has rarely occurred, except amongst the recruits, the worst and indeed inveterate cases having been received from a detachment that joined from Peynt. In the earlier part of the year, fevers more simple and amenable to remedial measures, partly no doubt from the constitutions of the men being then not

so debilitated as latterly; but in the rains, and as the cold season advanced, they became more apt to be associated with thoracic or abdominal complications. The former was the more common, and was usually of a bronchitic character; the latter, though more rare, was more obstinate, and consisted of splenic enlargement with or without hepatic derangement. The treatment under the peculiar circumstances required more than usual care, from the liability of cachexy to supervene in men whose vital powers were below par. In the cold season, so depressed were some of the cases of fever which followed prolonged fatigue, that they assumed the typhoid character with sleeplessness, and required diffusible stimulants with unremitting vigilance and support to prevent them from sinking.

*Fever.*—The admissions from Fever have been numerous; but considering the circumstances, and malarious districts in which the troops have been engaged, cannot be thought large, 202 ephemeral, 312 quotidian, 23 tertian, and 10 quartan intermittents; in all 547 admissions. The indication has been to have recourse to antiperiodics, and to support the powers of the system at the same time. In cases of relapse, quinine or cinchona was at once used, often without any preparatory measures. In instances in which a scorbutic diathesis had become developed, a combination of quinine, limejuice, arrack, ginger, and chiretta, was found serviceable. In thoracic complications dry cupping was depended on from time to time, with the view of relieving congestion and preventing it from running into inflammation. Cerebral complications were rare; and in those met with in the cold season, they sometimes assumed the form of hemicrania; a variety of neuralgia, which is not uncommon in Central India. A few cases of otorrhœa, another disorder met with in the same locality, also occurred in the cold weather. Keeping steadily in view the proclivity to dysentery and diarrhœa in febrile attacks of an asthenic nature, and of the necessity of adjusting the kind and degree of remedies to the constitution, strong purgatives were not employed, laxatives merely being used. The form generally preferred was a combination of rhubarb, ginger, magnesia, and camphor; but in men of more vigorous powers, with furred tongue, without florid edges, an emetic was premised frequently. The other antiperiodics

chiefly relied on were sulphate of iron with sulphuric acid in bitter infusion. After the disease had been checked, quinine was also combined with sulphate of iron or sulphate of zinc with the view of economising our supply of it. Liquor arsenitis was likewise frequently used in the early part of the year; but latterly, when it was of importance to check the disease at once, it was not much depended on, from my not possessing sufficient confidence in its power unless given in large doses, which would hardly have been advisable in many cases with scorbutic diathesis.

*Diseases of the Lungs* have been rather common, 71 catarrhal and 16 bronchitic attacks have been admitted under treatment. They were generally relieved by saline diaphoretics combined with anodynes, followed by stimulating expectorants, diuretics, and tonics, with frequent dry-cupping. Two cases of the more severe form of pleuro-pneumonia were met with: several instances also of asthenic pneumonia came under observation, unaccompanied by pyrexial symptoms, the acceleration of breathing, bronchial respiration, and crepitant rales being the leading symptoms. In this condition, the administration of quinine combined with tartrate of antimony, and the local application of cupping glasses to the affected part, were found sufficient to relieve the capillary congestion.

*Diseases of the Stomach and Bowels* though somewhat numerous have been usually of a mild description,—67 cases of diarrhœa, and 5 of dysentery. The affection was in all cases checked as soon as possible by the early use of asringents, combined with or followed by tonics, and due attention to diet. Under the head of dyspepsia have been included two cases which reminded me of the affection described by Dr. J. Scott, when in charge of the Regiment at Aden.* In them, besides the ordinary symptoms of indigestion, anorexia, nausea, distension, there was a feeling of heat or pricking in the epigastrium, without any morbid sensibility. The tongue was slightly furred, without florid edges, the hepatic functions were but little disordered, the circulation was below the normal standard, the urine high coloured but non-albuminous. They proved tedious, and yielded slowly to treatment. Viewing them as dependent on impaired

* See Medical and Physical Society's Transactions, Old Series, vol. vi., p. 153.

functions of the stomach and bowels, they were treated by a course of mineral acids, cod liver oil, the occasional use of the mildest aperients, sinapisms, and turpentine epithems, with due attention to diet. One of the instances referred to, at one time threatened to degenerate into ascites, but this condition gradually disappeared.

*Cholera.*—Only one case came under treatment, and it was of a sporadic character. It occurred after the return of the pursuing column from the Rajapoor jungles in September, when the weather was hot, close, and damp. Chloroform was administered internally with excellent effect, allaying the anxiety, relieving the irritability of stomach, and diminishing the jactitation which had commenced. The attack was followed by secondary fever, which subsided under the use of dilutents and diuretics. From the favourable results of this remedy in Dr. Lownds's trials of it, and from having seen it frequently employed at the Richmond Hospital, Dublin, by Dr. Gordon with marked benefit, and from having also used it myself in some cases of choleraic disease in Bombay, I am inclined to place confidence in its efficacy as an internal remedial agent.

*Diseases of the Liver* have been confined to three admissions: one of hepatitis, occurred on detachment duty, and two of icterus at Regimental head quarters.

*Syphilis.*—Venereal diseases, as has been already mentioned, have not been common, 28 cases of primary syphilis, 3 of constitutional syphilis, 9 bubo, 11 gonorrhœa, 5 orchitis, and 1 stricture of the urethra. The most inveterate cases of this class were derived from a detachment that had been absent from regimental head quarters at Peynt, of which two had to be invalided. The only instance requiring special mention was one of ozœna, which originated in an attack of catarrh in a cachectic individual with syphilitic taint. The offensive discharge remained stationary for a long time, and seemed little affected by remedial measures; but at length it gradually yielded to a long course of iodide of potash with tonics, and the continued use of tepid astringent injections.

*Rheumatism.*—This affection has been somewhat common from the predisposition in many individuals with constitutions more or less impaired by fatigue and privation, and exposure to great variations of temperature. The disease has usually presented

itself in the chronic fibrous form, or has been combined with a scorbutic diathesis or venereal taint. The first and second varieties were more common, the third less so, but more recurrent and much more inveterate. The disorder was situated in the knee, ankle, or elbow-joint, but in a few rare cases the wrists hands, and feet, were involved simultaneously. These cases were traceable to a venereal taint. In no instance was cardiac complication observed during the year.

*Wounds and Injuries* require little more than an enumeration of their number, character, results, and treatment. This will perhaps be most clearly shown by an extract of the nominal list of wounded treated since last report :—

1 Burn, from explosion of enemy's magazine ; very dangerous ; lingered four days ; fatal.
1 Musket-shot wound, through the mouth ; severe ; recovered.
1 Contusion from shell, in abdomen ; slight ; recovered.
1 Cannon-shot wound of leg ; comminuted fracture of tibia ; amputation below knee ; recovered, and pensioned.
1 Musket-shot wound of arm, with fracture of humerus ; recovered.
1 Musket-shot contusion ; surface of foot ; slight ; recovered.
1 Contusion from shell, with wound of head ; severe; recovered.
1 Musket-shot wound of finger ; slight ; recovered.
1 Do. in head ; mortal ; died in an hour.
1 Do. through the thigh ; severe ; recovered.
1 Do. in right forearm ; severe ; recovered.
1 Do. do. with ball lodged in front of ulna ; extracted ; recovered.
1 Wound, sword-cut in hand ; slight ; recovered.
1 Musket-shot in right groin ; slight ; recovered.
1 Bayonet wound in face ; slight ; recovered.
1 Musket shot through the arm and walls of chest ; severe ; recovered.
1 Sword-cut through occipital and temporal bones, and through ear ; very severe ; partial paralysis ; recovering slowly.
1 Contusion from musket on head ; slight ; recovered.
1 Musket-shot of thigh, with fracture of upper third of femur ; very dangerous ; since dead.
1 Musket-shot of forearm ; severe.

1 Musket-shot of hand; severe; partial amputation; recovering.
1 Burn, from explosion of one of the enemy's powder bags; severe; recovered.

One of the most severe cases met with was musket-shot wound of upper third of thigh with fracture of femur, in which the state of the patient's constitution prevented any operative interference from being attempted. It occurred in an individual whose reduced state of constitution held out little hope of recovery. He is still under treatment, but there seems very faint prospect of his long surviving the injury. The general treatment I need not detail in length.

Gunshot wounds were dressed on a plan somewhat similar to that followed in 1st Regiment Fusiliers at Delhi. After extraction of the ball, a small fold of lint dipped in sweet oil covered with oiled silk was applied over the wound and retained in position by a bandage. This dressing was regularly changed daily: it was found that, unless this was done with the utmost regularity, diffuse inflammation of the surrounding integuments and subcutaneous cellular tissue was apt to occur from the retained secretions of the wound becoming acrid and irritating from the heat of the weather, and also in some measure probably from the impaired constitutions of the men. The dressing was gradually rendered more stimulating as suppuration progressed, by the addition of spirit of turpentine, and chloride of lime solution was also used daily to the wound to remove the fœtor which, notwithstanding the greatest attention to cleanliness, was sometimes almost intolerable.

*Diseases of the Brain* were rare, and were confined to 5 cases of sunstroke and one of amentia. The former occurred in weakly men who had been exposed to great heat in May and June. They were all of the slighter form, and presented similar symptoms,—drowsiness, vertigo, feeble circulation, impeded respiration, complete prostration, and disposition—in one case—to sickness. They were promptly treated by removal to the nearest shade, by copious cold affusion to head, dashing the face forcibly with water, and by the internal exhibition of diffusible stimulants, and afterwards counteracting any reactional febrile accession by cooling dilutents and diuretics. The case of amentia was formerly submitted. The individual was, after a course of treat-

ment, brought before a medical committee, and was discharged from the service.

*Other Diseases.*—The class of "other diseases" require little more than that allusion should perhaps be made of the prevalence of cynanche parotidea epidemically in April and May. Two of the cases were associated with adynamic symptoms, dry brown tongue, with slight bronchitic symptoms, and recovered after a protracted convalescence. It only remains for me in conclusion to enumerate the casualties which have occurred in hospital. The first was from a severe burn from an explosion of enemy's magazines. The second was from hæmorrhagic dysentery in a cachectic individual at Gwalior; and the third arose from a gun-shot wound of the head at Beejapoor, from which the patient sunk in about an hour after being brought under treatment.

*Annual Return of Sick of the 10th Regiment N. I., for the Year 1858-59.*

STRENGTH 735. *Camp Jamnair, 1st April 1859.*

| | Treated. | Died. |
|---|---|---|
| Fevers | 555 | .. |
| Eruptive Fevers | 1 | .. |
| Diseases of the Lungs | 95 | .. |
| Diseases of the Liver | 3 | .. |
| Diseases of the Stomach and Bowels | 99 | 1 |
| Epidemic Cholera | 1 | .. |
| Diseases of the Brain | 6 | .. |
| Rheumatic Affections | 58 | .. |
| Venereal Affections | 60 | .. |
| Abscesses and Ulcers | 109 | .. |
| Wounds and Injuries | 151 | 2 |
| Punished | 3 | .. |
| Diseases of the Eye | 8 | .. |
| „ of the Skin | 29 | .. |
| Other Diseases | 58 | .. |
| Total | 1236 | 3 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 168·1 |
| Ditto of deaths to ditto | 0·4 |
| Ditto of ditto to treated | 0·2 |
| Daily average number of sick | 46·9 |

# ANNUAL REPORT OF THE EUROPEAN GENERAL HOSPITAL.

*For the Year* 1858-59.

BY SURGEON A. H. LEITH, M. D.

Presented by the Director General, Medical Department.

At the close of the last annual report, there were 120 patients in hospital under treatment : of these 6 died, making altogether 135 deaths among the 1,870 admitted, giving a mortality of 7·22 per cent. for the year 1857-58, which in the preceding eleven years was exceeded only in 1849-50 and 1851-52, when the ratios were respectively 7·62 and 7·96 on the admissions.

To relieve the overcrowded Hospital, the sick women and children were transferred, on the 10th July, to the Jamsetjee Jejeebhoy Hospital; and on their return on 10th December, it was ordered that all military patients who by the regulations have a claim on the European General Hospital, should be accommodated with the sick of the Artillery in Fort George, while an additional ward was being built over the centre of the Hospital. By this arrangement, it became practicable to commence the building of the additional ward, but as a large portion of the accommodation had to be given up to the workmen the crowding of the patients continued. The construction of this new ward, and of four new rooms sanctioned for delirious patients, is not yet completed.

Notwithstanding the temporary transfer of women and children and the military sick to other Hospitals, the admissions amounted to 1,929; and the daily average number under treatment was 101·4. Of those admitted, 87 had died, and 93 still remained under treatment on 31st March.

During the past year there was but one case of cholera, and it ended well.

Small-pox admissions continued in April and May; but after that month there were none until January, when they again began, and from that time they went on progressively, in accordance with the results of observations elsewhere noted of the increase and decline of the disease at certain solar periods. The admissions for variola were 25, and the deaths were 7, of which some were among cases that had remained from the preceding year.

The admissions for fever were more numerous than in the preceding year,—being 362. Of these, more than a seventh part were from among the workmen and overseers of labourers employed in the construction of the waterworks on the Island of Salsette. In a large proportion of those suffering from intermittent fever, the spleen was found to be enlarged, and in some the liver also was tumid. These complications required no special treatment, as the visceral tumefaction quickly subsided under the use of the quinine given to arrest the fever. In several cases of intermittent fever, opium was efficacious in preventing the recurrence of the paroxysm, when quinine, given in the usual full quantity of 30 to 40 grains in twenty-four hours, had failed to do so.

There were 7 deaths from fever: 3 were seamen, 1 a stoker in a steam ship, 1 a warrant officer in the dockyard, 1 an overseer of labourers, and 1 the wife of a soldier. The probable duration of the attack in these fatal cases was 5 days in one case, 7 days in two cases, 15 days in two cases, and in the remaining two it could not be ascertained. The patient died within 48 hours after admission in three cases, and within 60 hours in another case: in the others death took place in from 5 to 10 days. In all instances delirium preceded death. The fatal termination was in one by gradual exhaustion and sinking, in another by collapse, in two by coma, in one by convulsion followed by coma, and in the other two by convulsion ending suddenly.

There was examination of the body after death in 6 of the cases; and in all these the meningeal vessels were congested, and there was more or less serum in and under the arachnoid

membrane and in the ventricles. In one, there were slight interlobular pleuritic adhesions. In five, in which the spleen was weighed, it varied from 10½ to 32 ounces. In one, there was ulceration of the ileo-cæcal valve with dysenteric ulceration of the ascending and transverse portions of the colon; and in another, ulceration of that valve with enlargement of the solitary glands, but no ulceration of either the ileum or colon. In one case, the lower ends of both kidneys were a dark green colour, and the lining of the pelves had a yellowish puslike coating; the structure however of these viscera did not appear to be morbidly altered.

Among 28 admissions for bronchitis, there was one death in a patient who was attacked while under treatment also for stricture of the urethra and fistula in perinæo. After death, the kidneys were found to be disorganized.

There were 40 admitted for phthisis pulmonalis; and of these 11 died: but although in all the ten of these cases in which the body was examined after death, tubercles were found in the lungs, verifying the diagnosis made on admission, yet the death of one of them (W. L. 31st July) is to be ascribed to dysentery which manifested itself after admission, and under that head the morbid appearances will be noticed.

Besides the presence of tubercles in various stages and pleuritic adhesions, there were found small superficial circular ulcers in the colon only, or in both colon and ileum, in five cases; in three the mesenteric glands were enlarged, and in one the liver was mottled.

Classed under the denomination "Diseases of the Liver," there were three admissions for icterus, and 1 for hepatic congestion; the others, amounting to 55, were for hepatitis or hepatic abscess.

In the treatment of recent acute hepatitis, I still consider sanguineous depletion to be the chief remedy; and I find it to be as well borne now as it was twenty-five or twenty-six years ago. In aid of the depletion, purgatives are used. Should the tumefaction continue, when bleeding is thought to be no longer admissible, liquor potassæ, in doses of a drachm three or four times a day, is given; and at a later period blisters or other

counter-irritants are used if the intersticial deposit remains long unabsorbed, but they are never used by me during inflammatory action.

In some instances of persons in a feeble state, the hepatic inflammation has been treated with liquor potassæ, aperients, and fomentations, without the detraction of blood.

There were 8 deaths from hepatic disease; seven of these were mariners, and one was a warrant officer in the Ordnance Department. The age of five was from 20 to 29 years, of two from 30 to 39, and one was 44 years of age. Four of them had been less than 1 year in India, two had been less than 5 years, and the other two had been upwards of 10 years in this country.

In seven of the cases, the body was examined after death, and hepatic abscess was found in all of these; there being 1 abscess in 5 instances, 2 abscesses in 1 instance, and 4 abscesses in the remaining case. The abscesses were in the right lobe in 4, in the left lobe in 1, and between these lobes in 2 cases. The abscess had discharged through the lung in one, and through the duodenum in another; and in the other 5 patients the contents of the abscesses were not discharged. There was pulmonary inflammation in one case from the abscess pointing in that direction; in one, there was severe recent pericarditis and endocarditis from the abscess having pointed towards the pericardium; and in another there were diseased cardiac valves, and an old mark on the pericardium of former inflammation. There were tubercles in the lungs in one case; there were dysenteric transverse ulcers in the colon in 3 cases; and in the other two there were small superficial ulcers in the mucous lining of the colon. In one of these last, diarrhœa had come on after the abscess had begun to discharge by the lung; in the other, the history of the case is imperfect: the man was admitted with hepatic abscess 8 days before death, and diarrhœa was then present.

The admissions for dysentery and diarrhœa were fewer than in the preceding year, and the mortality was much less. There were 134 entered as dysentery, and 81 as diarrhœa; but among the latter, many probably were cases of chronic dysentery.

In the treatment of recent acute dysentery in persons of unbroken constitution, I place most reliance on free bleeding; at the same time I use frequent hot fomentation, and a moist compress over the abdomen, and give small doses of ipecacuanha with or without opium. After free bleeding, when the disease advances, I give opium largely. Astringents I avoid until the acute stage is past; but in some cases when it has assumed a chronic form, I have found the sulphate of copper, in small doses, and combined with opium, a most useful remedy. I have for some time discontinued the use of mercury in dysentery, thinking it useless, and often hurtful. In the treatment of the disease, each case has, of course, to be separately judged of with reference to the age and strength of the patient, the complications there may be, and the progress the disease has made, and also as to the time it has existed. This last point, however, ought not always to have much weight, as dysenteric inflammation does not run its course in a certain number of days like some of the exanthemata, nor is the inflammatory process always in the same stage at the same time in the different affected parts of the colon.

The disease may continue in a mild form for a long time, and then become aggravated; or even when it has shown itself acutely in a limited portion of the intestine, it may go on by extension for a considerable time after the part first affected has thrown off sloughs. It is sometimes seen that dysentery, after having been present for many days in a slight degree, and without treatment, becomes greatly aggravated, and is then benefited by treatment as active as would have been had recourse to, had it been suddenly severe at its commencement.

In reviewing the cases of dysentery that recovered and were discharged during the year, it is found that $8\frac{1}{2}$ per cent. were complicated with hepatitis.

Although bleeding has been freely used in the treatment of visceral inflammations since I have had charge of this hospital, yet venesection has not once been had recourse to during that time. I find it more advantageous to use large topical bleedings, by means of leeches, in the manner mentioned by me in my medical reports when in charge of 1st Troop Horse Artil-

lery. As I then stated, leeches suck blood in tolerably exact proportion to their own weight, irrespective of their size, and this proportion I find in practice to vary from 4 to 5 times their weight; the fluctuation being apparently attributable partly to the quality of the leeches, and partly to the state of the cutaneous circulation of the patient. If I wish to bleed to 4 or 5 ounces, I order 1 oz. of leeches to be weighed and applied; if to 10 or 12 ounces I order 2½ ozs. of leeches; and if to about 18 ounces I order 4 ozs., and these draw within an ounce or two of that quantity. Local depletion is thus practised with precision equal to that of cupping by an expert operator, and far exceeding that of ordinary cuppers; and at the same time with much less suffering to the patient, and without the injurious pressure on the inflamed viscus that sometimes attends cupping. Although the size of the leeches does not materially affect the quantity of blood that a certain weight of them draws, yet it is a matter of some importance that large ones be used, as by thus lessening the number of bites the patient is saved from unnecessary pain, and the indefinite small oozing of blood after their application is lessened.

The leeches commonly used in Bombay are so small, that I have known 15 dozens weigh but 3 ounces; and it is difficult to obtain leeches of such size, that 12 or even 18 will weigh an ounce, unless by previous arrangement with the leechman. In an hospital, however, where the leechman is paid by the month, it is most easy to obtain large leeches, as it is merely by their repeated application that they attain to their large capacity. As a check on the leechman, and in order to prevent the use of leeches before they have recovered from their last repletion and disgorgement, which requires about three weeks, I always have the weight of those ordered ascertained, after they have filled themselves, as well as before they are applied.

The deaths under the head of dysentery were 29; and to these have to be added that of one who was borne on the register under diarrhœa, viz. G. D., 15th June, and one (W. L. 31st July) who was admitted for phthisis, but died of dysentery; with these transfers the fatal cases of dysentery amount to 31.

Distributed according to the occupation of the sufferers, there were—

| | |
|---|---|
| 24 | Seafaring. |
| 2 | Overseers of Labourers. |
| 1 | Soldier of Portuguese army. |
| 2 | Clerks. |
| 1 | Copper smith. |
| 1 | Wife of Serjeant. |
| 31 | |

| | | | | |
|---|---|---|---|---|
| The age was | - | 19 | years in | 5 |
| | 20 to | 29 | „ | 7 |
| | 30 to | 39 | „ | 10 |
| | 40 to | 49 | „ | 4 |
| | 50 to | 59 | „ | 5 |

The residence in India at time of admission was—

| | | | |
|---|---|---|---|
| Under | 1 | month in | 4 |
| „ | 3 | „ | 5 |
| „ | 6 | „ | 4 |
| „ | 1 | year „ | 2 |
| „ | 5 | „ | 7 |
| „ | 15 | „ | 3 |
| Above | 15 | „ | 6 |

The body was examined in 29 instances; and ulcers more or less extensive were found throughout the entire length of the colon in 23; in only the transverse and descending portions in 5; and in only the ascending and transverse in 1 instance. In no case was the ulceration limited to the transverse arch, or to either the ascending or descending to the exclusion of the transverse portion. In eleven, the ulcers were transverse; in six, they were both circular and transverse; and in eight, they were undefined from great extent of sloughing. There was granular exudation in four instances. The morbid appearances in one of the cases, that of C. L., 18th July, were peculiar. The patient, æt. 51, and 19 years in India, and a free liver, had suffered often from dysenteric attacks. In the cæcum and ascending colon there

were black spots ¼ to ½ inch in diameter caused by gangrene of the tissue lying between the mucous and the peritoneal layers of the intestine. The mucous membrane was detached from over some of these spots, leaving them exposed, others of them were seen through the still perfect and diaphanous mucous and serous membranes, the blackness being in some more marked on the outer, in others on the inner surface of the intestine. There was ulceration of the mucous lining of the transverse arch, but no gangrene of the subjacent tissue. The lower part of the descending colon was contracted, thickened, and hard. There was a reticulation on the inner surface of prominent white transverse rugæ and the longitudinal bands of the intestine, and in the depressions there were transverse black streaks produced by a gangrenous state of the middle layer of the intestinal wall; and here also the blackness was more distinct sometimes on the peritoneal, sometimes on the mucous aspect; the mucous membrane had in some places been detached, but the peritoneum was nowhere perforated. In the lower 12 or 15 inches of the ileum, the valvulæ conniventes were much injected, prominent, and stiff, and the summits of their ridges were ulcerated. The liver, when cut, had the nutmeg appearance; the spleen was large, and in the kidneys the distinction between the cortical portion and the tubular was in part effaced.

In 8 of the cases there were indications of peritonitis. In 5 there were signs of pulmonary, and in 2 of cardiac, disease. Besides the instances above mentioned, there were other two of nutmeg liver. In a female patient who was in 8th month of pregnancy, premature parturition greatly aggravated the disease and hastened death. In two, there was hepatic abscess in the right lobe; there being 1 abscess in one, and 2 in the other case; in neither had the abscess discharged.

On arranging all the cases in which dysenteric ulceration, and all in which hepatic abscess, was seen after death, there are found dysentery without hepatic abscess in 30, dysentery with hepatic abscess in 5, and hepatic abscess without dysentery in 4 instances. If all such cases that have occurred in this hospital during the last three years be added to those given in Dr. Stovell's Decennium of the Hospital Statistics, recorded in the

Transactions Medical and Physical Society 1855-56, there will be the aggregate of—

| | |
|---|---|
| Dysentery, without hepatic abscess.... | 188 |
| Dysentery, with hepatic abscess ..... | 50 |
| Hepatic abscess without dysentery .... | 41 |

There were 7 admissions for apoplexy, and all ended fatally; 2 within half an hour of admission, 1 within an hour, 2 within two hours; 1 lived 7 and another 24 hours. No trustworthy information could be got as to the exact time the sufferers had been ill before being brought to hospital. 3 were seamen, 3 were military pensioners from 50 to 80 years old, and one was a discharged soldier. There was more or less serum in the head, and the meningeal vessels were congested in all. In one there was an intensely red injected state of the membrane over the middle of one of the cerebral hemispheres. The kidneys were degenerated in two. In the old pensioner the liver was of nutmeg appearance when cut, and the aortic valves were partly ossified. In 3 of the cases, hard drinking was the probable cause of the attack; and these 3 deaths ought therefore to be assigned to ebrietas.

The death from epilepsy was in a pensioned bandsman, who, for 4 years, had been deaf and had suffered from epileptic fits, and cramp-like pain and stiffness of the right thigh. His illness terminated with coma and stertor, prolonged convulsions of left side of the face, and of the extremities also of that side, followed by paralysis of the same side and failing circulation. On raising the dura mater, coagulated blood was found covering the right hemisphere of the cerebrum, and the meningeal vessels were gorged with blood. The left lateral ventricle was distended with serum; the right contained none, and the cerebral substance surrounding it was soft and pultaceous.

There were 49 admissions for delirium tremens during the year. The treatment was the same as was mentioned in last year's report, and the result was satisfactory.

For some time past I have attended to the state of the pupil of the eye in all cases of delirium tremens that have come under my care, and the result of my observations is, that the pupil is dilated in this disease; but that, at the same time, the iris is sensi-

tive, readily obeying the stimulus of light: the pupil oscillates about a mean diameter abnormally large.

The note made of the state of the pupil in medical cases is usually very unsatisfactory. The patient may have just been brought to hospital, having never been seen before, yet, without any opportunity of knowing the natural size of that man's pupil, its present state is written down as *contracted*, *dilated*, *moderate*, or it may be called *normal*. Very uncertain information is thus recorded, as the size of the pupil varies in different individuals and there is no common standard with which it can be compared: what, for a person with a naturally small pupil, would be a dilated state, would for another be moderate, and for a third who had usually a very large pupil, it would be a contracted state.

That the notes made in this hospital may be more precise, I compare the size of the pupil with that of the clear cornea, and mention the proportion that the diameter of the former bears to that of the latter, in each individual case in which the state of the pupil is referred to as a symptom. And as, with an inexperienced eye, it is very difficult to estimate accurately the proportion that one circle bears to another, I use a diagram in which there is a row of disks of uniform size, each having in its centre a smaller black disk which represents the pupil of the eye. The inner black disks vary in size, and form a regular series representing fractional parts of the outer disk. The scale shows at one end a pupil of which the diameter is $\frac{1}{5}$th, and at the other end a pupil in diameter $\frac{4}{5}$ths that of the cornea.

The size of the clear cornea varies in different individuals, but as it is not the absolute size of the pupil or of the cornea that is required to be noted, but their relative proportions, it is not of much importance what diameter is assumed for the larger disk. In the diagram I use it is half an inch, and the larger disks are coloured to resemble the iris. With the aid of this diagram or scale, I estimate and note the relative size of the pupil on admission, and during delirium; and again, after all signs of delirium have for some time ceased, the patient being also free from the influence of opium or other medicine. I take care that the circumstances as to light are the same at each observation; and to

secure this, I find it best that the patient's eyes should be directed to the sky and not to the observer, and that the time of day be always the same.

There were 2 deaths under delirium tremens, but neither of the cases was illustrative of the treatment generally followed in this hospital. One was a man who had been ill with dysentery, and had, at the same time, been drinking hard. On admission he was very weak, with a cold and clammy surface and feeble pulse, and dysenteric purging was present. During the night following his admission, the hallucinations of delirium tremens began, and the Assistant Surgeon, in registering the case, entered it under this disease. The dysenteric ailment was treated with opiates. He died three days after admission. Much serum was found in the head. Both circular and transverse ulcers were found through all the colon, and the kidneys were degenerated.

The other case was that of a warrant officer of the Ordnance department who had before been treated for delirum tremens. He was admitted with catarrh and fever and was tremulous, and had evidently been drinking hard. He was treated for the pyrexial symptoms with small doses of tartrate of antimony and nitrate of potash. He continued sleepless from the time of his admission, and on the 4th day became delirious; the skin continued hot and dry; the pupil was very small. On the following day, he had convulsions and died. The contracted state of the pupil in this case was viewed as an anomaly, until after his death, when a phial of laudanum half empty was found concealed in his bed. On examination after death, the meninges were full, and serum was found under the arachnoid, but none in the ventricles. In the lungs there was very great sanguineous congestion. The right and spigelian lobes of the liver were mottled, the left lobe was not so. The spleen was large, and externally of the same colour as the liver.

There were 166 admissions for rheumatism, and among these several instances of carditis and metastasis to the head were met with. Two of the latter ended fatally, and in neither of them was any peculiar morbid condition of the encephalon detected after death.

In examination after death in the 4 fatal cases of ascites, there were found cirrhosis of the liver in two, and degeneration of the kidneys in the other two. In one of those with cirrhosis, there were hypertrophy of the heart and disease of its valves.

In the case of consecutive syphilis which died, there were sloughing of the scrotum and testicles and diarrhœa. After death, besides a diseased state of the intestines, there was found fatty degeneration of the kidneys. In the fatal case of albuminuria, the kidneys were otherwise diseased, being hard and mottled with yellow specks; one, weighing 3 ounces, had in its substance several small abscesses, and had the tubular portion partly effaced.

No examination was allowed in the instance of diabetes; it terminated by ischuria and coma. In the scorbutic patient who died, the bladder was thickened, its mucous membrane was injected and corrugated, and the kidneys were vascular, granular, and friable.

One death took place from scrofulous disease of the foot, accompanied with diarrhœa; and one from abscess produced by caries of the sacrum and last lumbar vertebra. In neither was there any visceral disease found after death.

A fatal case of pyæmia occurred in a child consequent on measles, it was said: the body was not examined.

There was 1 admission for traumatic tetanus, from a puncture of the sole of the foot by a nail a fortnight before the accession of the disease. The disease lasted about 4½ days. Increased vascularity of the brain and spinal cord was found. A child with trismus nascentis was brought to hospital, but was taken away again before its death.

There were 2 deaths from hernia. In one there was collapse on admission, and there is reason to suppose that on its supervention, the hernia had been spontaneously reduced, as it was stated that on board ship the taxis had been unsuccessfully tried by a medical man, and on admission there was no protrusion, and the inguinal ring easily admitted the finger. A mass of small intestine was found agglutinated with lymph. In the other case, also a seaman, there was an enormous hernial protrusion of

intestine and omentum through the inguinal ring. He became collapsed soon after admission when the operation to relieve the strangulation was in contemplation, and he died 15 hours after the accident. There was red serum in the sac and in the peritoneum.

There was a death from stabbing in the abdomen, in a seaman. The colon was found to have been punctured, and there was general peritonitis. Also a death from injury of the head by a fall from the rigging of a ship; there was a contused wound over the outer end of *right* eye-brow, but no fracture; there were symptoms of compression during the 3 days the lad lived, and a small clot of blood was found on the posterior part of the *left* hemisphere of the cerebrum after death.

There were 132 admissions for *Ebrietas*, and no death was entered under that head; but, on reviewing the cases of the year, it is found that at least 3 of those brought to hospital in an apoplectic state were suffering from excessive drinking.

*Annual Return of Sick of the European General Hospital for the Year* 1858-59.

*Bombay, 1st April* 1859.

| Class of Disease. | Diseases. | Remained. | Admitted. | Total. | Discharged. | Died. | Transferred. | Remaining. | Total. |
|---|---|---|---|---|---|---|---|---|---|
| Fevers | Febris Ephemera | 1 | 41 | 42 | 42 | . | | .. | 42 |
| | ,, Intermittens Quotidiana | 5 | 246 | 251 | 246 | 2 | 1 | 2 | 251 |
| | ,, ,, Tertiana | 1 | 15 | 16 | 16 | .. | .. | .. | 16 |
| | ,, ,, Quartana | .. | 2 | 2 | 1 | .. | .. | 1 | 2 |
| | ,, Remittens | 3 | 55 | 58 | 52 | 5 | .. | 1 | 58 |
| | Cachexia Febrilis | .. | 3 | 3 | 3 | .. | .. | | 3 |
| Eruptive Fevers. | Varicella | 8 | .. | 8 | 8 | .. | .. | .. | 8 |
| | Variola | 12 | 25 | 37 | 27 | 7 | .. | 3 | 37 |
| | Rubeola | 1 | .. | 1 | 1 | .. | .. | .. | 1 |
| Diseases of the Lungs, &c. | Bronchitis Acuta | 1 | 19 | 20 | 19 | 1 | .. | .. | 20 |
| | ,, Chronica | .. | 9 | 9 | 8 | .. | .. | 1 | 9 |
| | Cynanche Trachealis | 1 | .. | 1 | 1 | .. | .. | .. | 1 |

| Class of Disease. | Diseases. | Remained. | Admitted. | Total. | Discharged. | Died. | Transferred. | Remaining. | Total. |
|---|---|---|---|---|---|---|---|---|---|
| Diseases of the Lungs, &c. | Aphonia | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Pneumonia | .. | 10 | 10 | 9 | .. | .. | 1 | 10 |
| | Pleuritis | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Hæmoptysis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Catarrhus Acutus | .. | 6 | 6 | 6 | .. | .. | | 6 |
| | Phthisis Pulmonalis | 2 | 40 | 42 | 26 | 11 | .. | 5 | 42 |
| | Asthma | .. | 7 | 7 | 7 | .. | .. | .. | 7 |
| Diseases of the Liver. | Hepatitis Acuta | 1 | 33 | 34 | 27 | 5 | 1 | 1 | 34 |
| | ,, Chronica | 1 | 19 | 20 | 17 | 2 | .. | 1 | 20 |
| | Icterus | .. | 3 | 3 | 3 | .. | .. | .. | 3 |
| | Abscessus Hepaticus | .. | 3 | 3 | 1 | 1 | .. | 1 | 3 |
| | Congestio Hepatica | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| Diseases of the Stomach & Bowels. | Enteritis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Hæmatemesis | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Dysenteria Acuta | 6 | 72 | 78 | 54 | 22 | .. | 2 | 78 |
| | ,, Chronica | 2 | 62 | 64 | 52 | 7 | .. | 5 | 64 |
| | Dyspepsia | 2 | 26 | 28 | 28 | .. | .. | .. | 28 |
| | Colica | .. | 30 | 30 | 29 | .. | 1 | .. | 30 |
| | Fistula in Ano | .. | | 6 | 5 | .. | .. | 1 | 6 |
| | Diarrhœa | 3 | 81 | 84 | 80 | 2 | .. | 2 | 84 |
| | Hæmorrhois | .. | 8 | 8 | 7 | .. | .. | 1 | 8 |
| | Obstipatio | .. | 17 | 17 | 17 | .. | .. | .. | 17 |
| | Cholera | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Colitis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Vermes | 2 | 4 | 6 | 6 | .. | .. | .. | 6 |
| | Gastro-Enteritis | .. | 1 | 1 | .. | .. | .. | 1 | 1 |
| Diseases of the Brain and Nervous System. | Cephalalgia | .. | 22 | 22 | 21 | .. | .. | 1 | 22 |
| | Neuralgia | .. | 4 | 4 | 4 | .. | .. | .. | 4 |
| | Ictus Solis | .. | 3 | 3 | 3 | .. | .. | .. | 3 |
| | Tetanus | 1 | 1 | 2 | 1 | 1 | .. | .. | 2 |
| | Apoplexia | .. | 7 | 7 | .. | 7 | .. | .. | 7 |
| | Hysteria | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Paralysis | 1 | 8 | 9 | 9 | .. | .. | .. | 9 |
| | Otitis | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Mania | .. | 8 | 8 | 8 | .. | .. | .. | 8 |
| | Delirium Tremens | 2 | 49 | 51 | 44 | 2 | 1 | 4 | 51 |
| | Epilepsia | .. | 6 | 6 | 4 | 1 | .. | 1 | 6 |
| | Hemicrania | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| Dropsies | Ascites | .. | 5 | 5 | 1 | 4 | .. | .. | 5 |
| | Hydrocele | .. | 8 | 8 | 8 | .. | .. | .. | 8 |
| Rheumatic Affections. | Rheumatismus Acutus | 4 | 108 | 112 | 105 | 2 | .. | 5 | 112 |
| | ,, Chronicus. | 3 | 58 | 61 | 59 | .. | .. | 2 | 61 |

| Class of Disease. | Diseases. | Remained. | Admitted. | Total. | Discharged. | Died. | Transferred. | Remaining. | Total. |
|---|---|---|---|---|---|---|---|---|---|
| Venereal Affections and Disease of Genital Organs. | Syphilis Primitiva | 15 | 77 | 92 | 90 | .. | .. | 2 | 92 |
| | „ Consecutiva | 5 | 18 | 23 | 20 | 1 | .. | 2 | 23 |
| | Ulcus Penis non-Syph. | 1 | .. | 1 | 1 | .. | .. | .. | 1 |
| | Bubo Simplex | 2 | 37 | 39 | 34 | .. | .. | 5 | 39 |
| | Gonorrhœa | 2 | 68 | 70 | 69 | .. | 1 | .. | 70 |
| | Orchitis | .. | 21 | 21 | 18 | .. | .. | 3 | 21 |
| | Fistula in Perineo | .. | 3 | 3 | 3 | .. | .. | .. | 3 |
| | Strictura Urethræ | 2 | 21 | 23 | 22 | .. | .. | 1 | 23 |
| | Uteri Morbus | .. | 1 | 1 | .. | .. | .. | 1 | 1 |
| | Phymosis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Paramenia | .. | 1 | 1 | .. | .. | .. | 1 | 1 |
| | Orchialgia | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| Abscesses and Ulcers. | Phlegmon et Abscessus | 2 | 28 | 30 | 25 | 1 | 1 | 3 | 30 |
| | Paronychia | .. | 3 | 3 | 3 | .. | .. | .. | 3 |
| | Ulcus | 4 | 49 | 53 | 48 | .. | 1 | 4 | 53 |
| | Furunculus | .. | 15 | 15 | 15 | .. | .. | .. | 15 |
| Wounds and Injuries. | Luxatio | 1 | 4 | 5 | 5 | .. | .. | .. | 5 |
| | Sub-luxatio | .. | 14 | 14 | 14 | .. | .. | .. | 14 |
| | Vulnus Incisum | .. | 8 | 8 | 8 | .. | .. | .. | 8 |
| | „ Sclopiticum | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | „ Laceratum | .. | 12 | 12 | 11 | .. | .. | 1 | 12 |
| | „ Confossum | .. | 1 | 1 | .. | 1 | .. | .. | 1 |
| | Contusio | 2 | 35 | 37 | 37 | .. | .. | .. | 37 |
| | Asphyxia Submersionis | 1 | 1 | 2 | 2 | .. | .. | .. | 2 |
| | Ambustio | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Hernia | .. | 11 | 11 | 11 | .. | .. | .. | 11 |
| | „ Strangulata | .. | 2 | 2 | .. | 2 | .. | .. | 2 |
| | Fractura | 4 | 24 | 28 | 24 | .. | .. | 4 | 28 |
| | Cerebri Concussio | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | „ Compressio | .. | 1 | 1 | .. | 1 | .. | .. | 1 |
| Diseases of the Eye. | Ophthalmia | .. | 16 | 16 | 13 | .. | .. | 3 | 16 |
| | Nyctalopia | .. | 7 | 7 | 7 | .. | .. | .. | 7 |
| Diseases of the Skin. | Ecthyma | 1 | 1 | 2 | 2 | .. | .. | .. | 2 |
| | Porrigo | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Dracunculus | .. | 11 | 11 | 11 | .. | .. | .. | 11 |
| | Scabies | 1 | 6 | 7 | 7 | .. | .. | .. | 7 |
| | Psoriasis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Lepra | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Impetigo | 1 | .. | 1 | 1 | .. | .. | .. | 1 |
| | Ichthyosis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Erysipelas | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Intertrigo | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Condylomata | .. | 4 | 4 | 4 | .. | .. | .. | 4 |
| | Acne | .. | 1 | 1 | 1 | .. | .. | .. | 1 |

| Class of Disease. | Diseases. | Remained. | Admitted. | Total. | Discharged. | Died. | Transferred. | Remaining. | Total. |
|---|---|---|---|---|---|---|---|---|---|
| Diseases of the Skin | Rupia | .. | 1 | 1 | .. | .. | .. | 1 | 1 |
| | Tinea Capitis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Herpes | .. | 3 | 3 | 3 | .. | .. | .. | 3 |
| Other Diseases. | Aneurisma Aortæ | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Cordis Morbus | .. | 4 | 4 | 4 | .. | .. | .. | 4 |
| | Varix | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Pyæmia | .. | 1 | 1 | .. | 1 | .. | .. | 1 |
| | Physconia Splenica | .. | 3 | 3 | 2 | .. | .. | 1 | 3 |
| | Nephritis | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Albuminuria | .. | 4 | 4 | 3 | 1 | .. | .. | 4 |
| | Diabetes Mellitus | . | 1 | 1 | .. | 1 | .. | .. | 1 |
| | Vesicæ Calculus | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Synovitis | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Morbus Coxarius | .. | 1 | 1 | .. | .. | .. | 1 | 1 |
| | Contractura Genuum | .. | 2 | 2 | 1 | .. | .. | 1 | 2 |
| | Necrosis | 1 | .. | 1 | 1 | .. | .. | .. | 1 |
| | Tumores | 1 | .. | 1 | 1 | .. | .. | .. | 1 |
| | Scrofula | 3 | 4 | 7 | 6 | 1 | .. | .. | 7 |
| | Scorbutus | 6 | 89 | 95 | 92 | 1 | .. | 2 | 95 |
| | Debilitas Congenita | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Diphtheria | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Gingivitis | .. | 2 | 2 | 2 | .. | .. | .. | 2 |
| | Cynanche Tonsillaris | .. | 6 | 6 | 6 | .. | .. | .. | 6 |
| | ,, Parotidea | .. | 1 | 1 | 1 | .. | .. | .. | 1 |
| | Ebrietas | 2 | 132 | 134 | 132 | .. | 2 | .. | 134 |
| | Parturitio | .. | 2 | 2 | 1 | .. | .. | 1 | 2 |
| | Total | 120 | 1927 | 2047 | 1866 | 93 | 9 | 79 | 2047 |

# GEOLOGICAL REPORT ON A PART OF BELOOCHISTAN.

BY ASSISTANT SURGEON H. COOK, M. D.,

In medical charge, Khelat Agency.

[This Report refers to the nature of the hills on the south of Dadur, and throughout the line of the Bolan Pass from its commencement near Dadur to its termination at the Dasht-i-Bedowlut.]

On the road from Mitnee to Dadur, we passed through a low range of hills running from S.W. to N.E. about 100 or 150 feet high, with face towards the plain scarped and showing evidences of water action. We entered the hills by a gorge forming the bed of a nullah, passing at right angles through the range, and, after winding about for the space of half an hour, emerged on a plain covered with stones and gravel. The hills wore a very strange aspect, formed of indurated mud or clay, capped by a stratum of sandstone, and covered universally with a thin layer of pebbles. The sides of the hills were deeply corroded by water both horizontally and perpendicularly, in some places bearing an appearance exactly similar to the mud walls of an old fort whose face had for many years been washed by the rain. Several very singular peaks and natural bridges were formed by the wearing away of the softer strata supporting the rock above. The range appeared to be composed of a succession of smaller ranges, cut up into isolated hills by water-courses. The road, as stated above, followed the course of a nullah, and was strewed with water-worn pebbles of blue and white limestone, showing traces of nummulites, masses of brimstone, and fragments of flint: many of the limestone pebbles were veined with quartz. Thin veins of gypsum were frequent in the clay substratum; and occasionally, where the bed of the nullah had been repeatedly broken up, strata of conglomerate appeared from one to several feet in thickness. The lying of the strata was for the most part horizontal,

but at the western flank dipped at an obtuse angle to the west, forming a semi-circular curve. South of Dadur 5 or 6 miles is the southern continuation of this range, which has here a different formation. It has a very gentle slope to the north, formed entirely of a bed of shingle several feet in thickness. The hills were much broken up and divided by watercourses. The vertical section showed :—1st, a stratum of pebbles; 2nd, 3 to 6 feet of conglomerate, resting on clays from 60 to 150 feet. The pebbles consisted of limestone containing nummulites and sandstone, some pieces of which were particularly coarse-grained and but little water-worn. I found also some heavy pieces of stone, black in colour, with a metallic lustre and conchoidal fracture. Five miles to the north of Dadur is a higher range of hills running eastward (or N. E.) from the great Halla range as far as the eye could reach, probably joining the Murree and Boogtie hills beyond Kujjuck. Through this range is a pass about 150 yards broad, evidently the bed of a torrent, covered with a thick layer of pebbles and boulders of the usual character, with here and there a mass of sandstone: across it ran a stream of very clear water. We first reached low hills or rather mounds of pebbles, then a section of conglomerate 30 feet thick, and then sandstone topping clay. Following the course of the pass, a very good section of the range was obtained. Its formation is rather peculiar. About the centre, the strata are horizontal, whilst on each flank, forming by far the largest bulk of the range, are a succession of upheaved masses or ridges standing at an angle of 45°. There are, perhaps, 6 or 7 of these parallel ridges, with sides scarped towards the centre and dipping to the plain. The upper stratum of sandstone was about 10 or 15 feet thick, but neither in this nor in the subjacent clay could I find a trace of fossils. The sandstone differed in character at different heights, being fine and hard-grained in some places, coarse and containing small pebbles and breccia of sandstone and limestone in others. Towards the centre I found a section showing—1st, a stratum of sandstone about 10 or 15 feet thick; 2nd, a layer of clay, about 12 feet; 3rd, a stratum of sandstone resting on clay, 50 feet. I also found gypsum in thin layers in the sandy clay, and further on a stratum, apparently containing iron, red in

colour and loose in texture, about 2 feet thick. We entered the Bolan Pass on the 27th of May. The first march is to Kondilani, 12 miles, a mere halting-place with no village. The entrance to the pass is about 5 miles from Dadur, its level being about 700 or 800 feet above that of the sea. The pass itself is a succession of narrow valleys between high ranges, having a north-westerly course. Through it runs the Bolan river, which rises at Sir-i-Bolan, one march from the western mouth of the pass. We first passed low hills of clay capped by sandstone, then limestone hills covered with loose pebbles and boulders, and lastly ranges of conglomerate of great height. The conglomerate strata were very strangely contorted, in several places becoming quite perpendicular, and showing the jagged edges of the fractured strata against the sky. The width of the pass at the entrance is about 250 yards, and it varies from this to about double the breadth until reaching Kondilani, where it is still broader. The road crossed the river repeatedly; and in fact passed along a portion of its dried bed covered with pebbles and boulders. The valley in which we halted was also covered with a deep layer of this shingle composed of nummulitic limestone of different colours. The conglomerate contained rounded masses of great size, and the mass of pebbles forming it were of the size of a man's head, chiefly blue and white limestone containing nummulitic fossils. Marched to Kirta, 14 miles. The valley immediately narrows to a pass with grand masses of conglomerate rock on each side, the river flowing through and across the centre. The cliffs are about 800 feet high, perpendicular, with horizontal or slightly oblique stratification, and rounded like the vast bastions of some stupendous fortification, whose base had been hollowed into caverns. The path is very rough for about three miles, it then opens out on a level, stony valley, twelve miles from the mouth of the pass. At a distance of five miles, the conglomerate suddenly and abruptly ceases, and another range commences nearly 1,000 feet high of limestone,—a broad gorge being between the two ranges: a few miles further on, limestone about 500 feet, based on clay white and red 250 feet. This clay became stratified below, and formed a white fissile shale which cropped out from the base of the scarped face of the mountain,

and lay in large quantities mixed with fragments of the limestone at its foot. This shale contained a considerable quantity of calcareous matter; and thin strata of white, chalky, and rather soft limestone were interleaved with it. The valley ran straight (in a northerly direction), about half a mile or more in breadth, for three or four miles,—strata horizontal. Towards its close, yellow and light red clays were seen very distinctly marked in the hills on the opposite side. The river ran in the middle of the valley, concealed by very high reeds and grass. We then turned sharp round the hill to the westward, passed again some rocks of conglomerate, and emerged on a broad, level valley bounded by hills of nummulitic limestone, here seen for the first time *in situ* (about 15 or 16 miles from the mouth of the pass). The nummulites were small, and the rock white and hard; boulders of all sizes lay scattered over the plain,—many of them contained very large specimens of nummulitic fossils. Halted at Kirta, a village with a fort situated in a stony valley covered with wheat fields. The river, here small and choked with high reeds and flags, runs under the base of the hills behind the town. Marched to Beebee Nanee, nine miles; crossed the plain of Kirta (five miles) in a N.N.W. direction; and reached the hills running north and south, which bound the valley on the western side. The road passes through the range about half a mile before it subsides into the plain by a small pass. The hill consists of an excessively hard light-colored limestone containing nummulites, veined with crystals of carbonate of lime, and having numerous small cavities filled with the same. We then passed over a second plain about three miles wide, bounded by a parallel range; and entering a gorge in this, came out on the small level valley of Beebee Nanee. A branch or feeder of the river, here a small stream of three or four yards in breadth, runs through it close under the base of the hill and escapes at the gorge; this range consists of the same nummulitic limestone. In some masses of rock, nummulitic fossils were of a large size, measuring two and a half inches in diameter. I also found a species of Spatangus with other echinodermata and a Planorbis. These ranges are about 300 or 400 feet high; but the range bounding the valley to the westward is much loftier, from 1,000 to 1,500 feet I should think.

In it is a narrow gorge, through which a mountain road leads to Khelat. I here also found small masses of quartz rock with very perfect six-side crystals, imbedded in a friable matrix resembling loaf-sugar. This matrix is calcareous and effervesces with dilute acid. The strata dipped to the west at about 45° to 60°; and in the hill just opposite camp to the northward they were nearly vertical. Marched to Abigoom, 14 miles; road very fatiguing, over loose shingle and boulders, northward to the mouth of the valley, meeting the river flowing south. It is near a small stream occasionally lost in the shingle and again emerging (whence the name of the halting-place). The bed of the valley is composed of conglomerate and loose shingle, with boulders of limestone and sandstone, and masses of angular sandstone. The range bounding the valley on the left hand is the high one I yesterday spoke of. It appears to be of nummulitic limestone resting on clay. A low range of conglomerate intervenes between its base and the valley. The range on the right hand is not so high, probably about 400 or 500 feet, of nummulitic limestone at first, and further on, of conglomerate and sandstone on clay and red marl; stratification horizontal at the narrowest part of the valley. A few miles below Abigoom, the conglomerate and sandstone bear evident traces of water action for many feet in height, evincing the force with which the usually little stream at times comes roaring down the pass. The view to the north is bounded by a very high range of mountains, running in the opposite direction to those we have passed, viz. from west to east. The ascent from Beebee Nanee is very gradual, but much more marked for the last four miles, at a gradually increasing ratio. The stream here runs very fast. The height by the boiling point of water is about 3,000 feet, or nearly 1,800 above Kirta.

At the halting-place, the valley is bounded to the right by a low range composed as follows from below upward :—about 35 feet of blue and yellow clay, interleaved with strata of limestone about two feet thick, containing a large number of fossils apparently Cerithium, Scalaria, and a bivalve Cardium. In the clay was a seam of coal much decomposed, earthy, mixed with dark coloured clay, and containing very thin veins of a yellow earth (ochre ?). The clay immediately in contact was of dark purple or

black colour, and dotted with bright red coloured earthy spots. The limestone strata also contained casts of shells in a red stone, whose fracture showed a glistening surface similar to calamine. The clay also contained thick veins of gypsum, and nodular masses, composed of crystals of carbonate of lime, intermixed with what appeared to be an opaque reddish yellow or brown variety of the same. These masses were very frequent, and lay in large quantities amongst the *débris* at the foot of the sections. The clay was surmounted by several feet of conglomerate and limestone. The strata dipped greatly to the south, and presented a scarped surface to the west. On reaching the top of the hill, I found quantities of pebbles and stones, less waterworn, lying on a thin stratum of conglomerate; and about a quarter of a mile distant from its edge arose a hill of nummulitic limestone about 150 feet high. Marched this morning on Sir-i-Bolan, six miles. Ranges on right hand, conglomerate for half a mile, height 200 feet, parallel stratification, then conglomerate and clay containing thin seams of coal strata dipping to the south; the whole surmounted with a thin layer of conglomerate not conformable. From the clay, a spring of water flowed and ran down the pass, to form with other small streams the Bolan river: conglomerate, 60 or 80 feet high, succeeded this for five miles. Left hand, conglomerate for two miles, clay half a mile, conglomerate one mile; then we reached the base of a mountain about 1,000 feet high, whose strike had a north-easterly direction, strata dipping to the south. It was flanked by a low range of parallel conglomerate. Large angular masses of nummulitic limestone lay in the bed of the river, but little water-worn. At Sir-i-Bolan this conglomerate ceased, and the foot of the mountain is exposed. Issuing from many fissures in its base are little streams of very pure, clean water. These are collected in basins worn in the rock, and flowing over which they run down the pass, forming the source of the Bolan river; height 4,370 feet, ascent gradual but very considerable. Started this afternoon at 4 P.M., and reached the Dasht-i-Bedowlut shortly after sunset. Our course first lay northward over the same kind of loose shingle; in half an hour the road became narrow, until at last, by the approximation of the ranges on each side, it was only sufficiently wide to admit three or four

men riding abreast. We first passed the continuations of the ranges of conglomerate on the right, and the side of the mountain of nummulitic limestone on the left; then parallel ranges succeeded by the scarped sides of the hills bounding the narrow pass. These towered above us to a great height and became loftier as we proceeded, composed of limestone (in which I detected no nummulites), resting on a stratum of a lighter colour, which was interleaved with thin strata of red, yellow, and white limestone exceedingly hard, fine-grained, and containing no fossils. The dip was at first to the south, but towards the close of the pass, to the north. After two hours, the pass gradually became wider, the hills less precipitous, until it opened out into a narrow valley extending westward. Several separate ranges of hills were passed of inconsiderable height, and at 7 P.M. we arrived at the end of the valley. Here the path cross-cut the crest of a hill about 80 or 90 feet high, and descended into the Dasht-i-Bedowlut, a broad plain, forming the highest part of the table-land of this portion of Beloochistan. It is bounded on the westward by the "Chehultan" range, which separates it from the valley of Moostung. On the east lay the range just named. To the north it communicates with the valley of Quetta; and to the south it is closed in by the meeting of the hill ranges bounding it east and west. It is about 15 or 20 miles across from E. to W., and perhaps as many from N. to S. The soil appears to be very fertile. It is watered by heavy dews, by rain, and by small rivulets which flow down the surrounding hills after rain. It is covered everywhere by a small odoriferous shrub, bearing minute leaves, greatly divided; the stems are purple below and green at their tops; and in the distance it has the appearance of heath, but I believe it is a labiate plant. Some portions of the *Buslit* are cultivated by tribes who frequent it during the spring and summer months for that purpose; and the crops of wheat, now just ripe, looked rich and good. The khurds are located on its borders, and have succeeded in procuring water from deep wells, although I believe several unsuccessful attempts had been made prior to this by the engineers of the British force stationed for some time at Quetta. These wells are not in the direction of the line of march, and no water is procurable between Sir-i-Bolan

and Sir-i-Ali. The height of the Dasht is about 5,800 or 5,900 feet above the sea, or somewhat more than 5,000 feet above the plains of Cutchee. The Bolan Pass, from the plains of Cutchee to the Dasht-i-Bedowlut is thus about 60 miles in length, passing in a N.N.W. direction through the great chain of the Halla mountains. It is formed by a succession of valleys of various widths (the broadest being the valley of Kirta), bounded by mountain ranges having a general N.W.W. strike, and a height which greatly varies in different parts, but which, perhaps, attains to its greatest in the mountain near Beebee Nanee. The pass is constricted at two principal points—namely, immediately after leaving Kondilani, seven miles from the easterly mouth, and beyond Sir-i-Bolan near its westerly termination, where a few determined men might hold it against vast odds. The ascent is inconsiderable until we reach Abigoom, when it becomes much marked; and in the last twenty miles 2,800 feet have to be surmounted. The temperature in the pass during the month of May is very high, as the atmosphere is excessively dry: nor is any amelioration of the heat experienced until we reach the point where the greatest ascent commences. The maxima in the shade were as follows:—

| | Dry Bulb. | Wet Bulb. |
|---|---|---|
| Dadur | 115° | 80° |
| Kondilani | 117 | 76 |
| Kirta | 121 | 78 |
| Beebee Nanee | 122 | 77 |
| Abigoom | 108 | 68 |
| Sir-i-Bolan | 101 | 68 |

As regards supplies, water is abundant and good throughout the pass. Grass and boosa are to be had only at Kirta, and a rank, coarse grass in the valley near Kondilani; wood is scarcely to be had at all. The mountains are excessively bare, and, with the exception of the last few miles beyond Sir-i-Bolan, where a few straggling trees are found, produce nothing that can be used as firewood. The small herbs and thorny plants on which the camel feeds are sprinkled over the valleys. In the ravines is found a plant called "Peenfullee," bearing a yellow berry having very little taste, which the natives use as a medicine in intermittent

fevers. It grows also in the Murree and Boogtee hills. The following table of the relative position of the various beds forming the Halla range is, I think, borne out by the previous description. Conglomerate, sandstone, clay,—of the low ranges near Dadur, and which probably form a bed of the plain, of inconsiderable thickness and non-fossiliferous. Sandstone, clay, conglomerate, of several hundred feet in thickness. Limestone, nummulitic limestone, and blue clay, containing seams of coal and shales, and interstratified by limestone (fossiliferous). I nowhere saw any trace of the bone-beds spoken of by Captain Vicary as flanking the Halla range, nor of the black slates underlying the nummulitic limestone. Although the nummulitic limestone might, perhaps, be divided into several separate beds, characterised by different degrees of hardness, compactness, admixture of arenaceous matter, subcrystalline texture, and variety of fossils, yet, as the line of demarcation is by no means distinct, I have not attempted it. I should, perhaps, explain that the altitudes of the ranges here given are only estimates of their heights, no positive data being attainable. The heights of the different stations were obtained by the boiling-point of water, according to the tables given in Jackson's "Military Surveying." I append a diagram of the rock, showing the relative extent of the different beds and the rate of ascent of the floor of the pass, from the plain of Dadur to the Dasht-i-Bedowlut, scale one inch to the mile.

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## Summary of Meteorological Register for the Months of May, June, July, and August 1859.

These months may be considered respectively as the hot season of the plains and the summer of the Table-land of Beloochistan; and as portions of this time were spent successively at Bhag and Dadur in the plains, in the ascent of the Pass, and at Quetta, Moostung, and Khelat in the hill country, it will, perhaps, be well to consider them thus separated, and obtain some kind of comparison of the climates of the various places visited.

Bhag is situated about 68° E. Long. and 29° N. Lat., and is the central and largest town of this portion of the province of Cutchee. We were here during the first week in May, at the

commencement therefore of the hot weather, and the thermometer gave the following results :—

| | Dry Bulb. | Wet Bulb. |
|---|---|---|
| Mean of 24 hours..... | 100°·5 | 76°·8 |
| Minimum ..... | 69° | 59° |
| Maximum ..... .... | 126° | |
| Difference between the dry and wet bulb .. | 23°·7 | |

From this, some idea may be gained of the actual heat during the height of the hot season. The air is excessively dry, as evidenced by the difference between the dry and wet bulbs (frequently 35°), and by the fact that I could obtain no dew-point even at 5 A. M., although I reduced the temperature of the hygrometer 50° below that of the atmosphere. The nights were cool and pleasant, cold indeed they might be called in comparison with the heat of the day. The wind was generally northerly during the time, moderately cool, but occasionally accompanied with clouds of dust, when its temperature was considerably raised.

There is but little in the surrounding country to moderate the climate of Bhag; large tracts of positive desert or put, varied here and there with strips of low jungle of Tamarisk, Kundo, Babul and Milkbush. In its immediate vicinity are fields and gardens, irrigated from the River Narra which, during this year, had a bund thrown across it, to detain its waters, which at certain seasons nearly flood the country, and at others entirely dry up and disappear. Its height is about 650 feet above the sea, or 50 above that of Jacobabad.

Dadur is situated about 67° 34′ E. Long. and 29° 28′ N. Lat., at a height of about 700 feet above the sea, and about 35 miles in a direct line to the north-west of Bhag. We remained here about 3 weeks, and found much both in its climate and the appearance of the surrounding country to induce us to think much more favourably of it than of Bhag, though from its confined situation at the base of the great range of mountains, and almost surrounded by lesser hills, we expected to find its climate still less bearable.

| | Dry Bulb. | Wet Bulb. |
|---|---|---|
| The mean of 24 hours gave... | 96°·29 | 71°·05 |
| The minimum ..... | 64° | 53° |
| The maximum ..... | 120° | |
| Difference between dry and wet bulb..... | | 25°·24 |

From this it will be seen that the extreme heat was less, and the mean of the 24 hours differed about 4°. The air was excessively dry, as indeed it is throughout Cutchee and Upper Sind. I tried repeatedly to obtain dew with the hygrometer but without success, although I reduced the temperature of the bulb 54 degrees. The wet and dry bulbs stood respectively at 72° and 102°, giving a difference of 30°. This, according to the Greenwich Table, should give the dew-point at a difference of 45°. The rule therefore does not hold good in Cutchee, however true it may be in England.

The skies were generally clear and bright, with the exception of a bank of clouds which rested on or over the Eastern flank of the Halla Range.

Wind. The wind was generally southerly with more or less of westing. It usually commenced about 8 A.M. or 9 A.M., and blew until night. A hot wind frequently blew from the N.W. at evening, coming on regularly about 2 hours after sunset, and lasting about an hour or an hour and a half.

Rain. Dew. No rain fell during our stay. The dew, if any fell at all, was very slight, as, although we slept in the open air, none was ever observed.

Dust. Two furious but short dust storms occurred, preceded for a day or two with more or less of dust in the atmosphere, this apparently accumulating by degrees until arriving at the climax, after which the air was clear and entirely free from any.

There is a good deal of cultivation around Dadur, large quantities of wheat being grown in the valley. This had been cut and carried before our arrival, and was now undergoing the process of being trodden out by cattle driven round a central post; and cleaned by being tossed up into the air, and thus subjected to the action of the wind; after this, it is thrown into great oblong heaps some ten or fifteen yards long, when its quantity is estimated by the Buniahs who rent the revenue from the Khan, and the proper percentage is abstracted.

Cotton, cucumbers, and melons are also largely grown.

The district is well supplied with water by the Bolan River, which, issuing from the mouth of the Pass, is immediately divided

into three principal streams, which are again and again subdivided as irrigation requires. The water is pure and good, and the soil, when irrigated, fertile and easily worked.

The town is much better provided with trees and gardens than Bhag; indeed, there is a considerable amount of foliage surrounding the town and the adjacent villages.

It is almost surrounded by hills—the great range five miles to the westward, and low ranges to the North and South about 5 and 6 miles respectively, running in a E.N.E. direction from it. From this cause, doubtless, is due the exceeding closeness and great heat when the prevailing southerly winds have ceased.

I have already spoken of the climate of the Bolan Pass in its geological sketch. I may here mention that, at this time of the year, the heat for the first 3 marches is exceedingly great, and Kondilani immediately inside the mouth of the Pass, is considered deadly at times, even by the Natives. No great amelioration of the heat is experienced until reaching a height of 3,500 feet. No dew was observed in the Pass, but on the Dasht-i-Bedowlut a heavy soaking dew fell. At Sir-i-Bolan (4,300 feet), I obtained the dew-point with snow and salt, at half-past 4 o'clock in the morning, at a temperature of 45°, the thermometer standing at 87°, difference 42°.

*Table-land of Beloochistan.*—The summer of the hill country of Beloochistan may be said to include the months of May, June, July, and a part or the whole of August; though the Natives expect the weather to change soon after the fall of rain, which takes place about the end of July and beginning of August.

Compared with the climate of the plains, it may be truly called delightful, and even bears a comparison with that of England.

The actual heat is, perhaps, greater,—I mean especially the intensity of the sun's rays,—but the weather is less variable, and seldom or never broken up into short seasons of heat and cold by the occurrence of rains and cold winds, as is so often the case in England.

The fruits and crops as a rule come to maturity and ripen quicker, and are not exposed to the contingencies which occur there, and so often blast the hopes of the agriculturist; indeed the labours of the husbandman are here, by comparison, small

and trifling, when we consider the richness of the soil, its lightness, and the ease with which it is worked, in addition to the above-named equality and regularity of weather.

The atmosphere is clear and pure, the air dry and bracing. The skies, usually bright and cloudless, or faintly chequered with light masses of cumuli and cirri, want the deep blue of southern climes, but have a beauty peculiarly their own.

The character of its climate depending on its altitude, of course varies in different portions of its extent. Khelat is the highest point (about 7,000 feet), and possesses the most agreeable temperature; Quetta (5,900 feet) resembles it; while Moostung, though but slightly lower (5,700 feet), is considerably hotter; and so doubtless are the valleys to the southward which I have not yet seen, but which, ascending by steppes to a level but little above that of the plains, lose more and more, until they reach Lus, the characteristics above-named. Moostung has been spoken of as the most eligible site for a sanatarium, but it is certainly considerably hotter than Khelat, its maximum reaching 109°, whilst at the latter place the highest was 101°, and that on an unusually hot day. From some cause also, whose source is not so evident, the relative heat was much more oppressive, and the air had not the buoyant and elastic character and bracing effect which are so evident in the higher region. Its heat often produced a drowsiness and languor which are not experienced here, when fatigue is also much easier borne.

The following are the means for the months of June, July, and August:—

| | Dry Bulb. | Wet Bulb. |
|---|---|---|
| Mean maximum ..... | 94°·46 | |
| Mean minima..... | 58°·31 | 49°·17 |
| Mean between sunrise and sunset. | 76°·34 | 59°·33 |
| Extreme maximum ..... | 103° | |
| Extreme minimum ..... | 48° | |
| Mean daily evaporation..... | 31° | |

Winds.

At sunrise, a gentle southerly breeze has been prevalent, falling off about 8 or 9 A.M., when the westerly breeze has set in; or the breeze has gradually gone round

from south to west, and towards evening has ceased, or veered to the north for a short time.

Easterly winds have blown occasionally, usually bringing up clouds from the S.E. or E., and not unfrequently storms of thunder and rain. This prevalence of westerly direction in the wind may, I think, be thus accounted for.

Commencing, as above stated, some three or four hours after sunrise, and increasing in strength until near sunset, when it gradually subsides. The sands of the desert of Cutchee and arid plains of Sind becoming intensely heated, rarify the lower strata of the atmosphere, which, ascending, produce a partial vacuum, to fill which the cooler and denser air rushing down from the mountain districts induce a steady current from the west as long as the exciting cause is in action: some time before sunrise this influence has ceased, and the original direction of the wind can be continued producing the southerly breeze so general at this time of the day.

Furious wind-storms, most probably of the character of tornadoes are not uncommon in the hill country; one occurred at Khelat in June, which I did not witness, but which left very evident traces of its violence in uprooted trees and rifled branches.

Clouds. The sky has usually been clear; almost always so at sunrise. Cumuli have formed during the heat of the day, gradually dissolving towards night, or, if continuing, forming masses of cumulo-strati, passing into nimbi, and ending in rain or thunder storms. A few cirri and cirro-cumuli before and during the occurrence of high winds.

Dew. Slight dew fell in the month of June; was more marked towards the end of July; and heavy throughout the beginning of August. The nights usually being clear and free from clouds.

Moisture. The air, although not showing the almost total want of moisture that exists in Cutchee, is still exceedingly dry. The difference between the dry and wet bulbs being 17°·01 for the whole day, from sunrise to sunset, and at times even reaching 36°.

The evaporation gave a mean of 31 cents. Immediately before and after a fall of rain, it was, of course, considerably altered, but

the air speedily regained its usual dryness. From the continuance and almost unbroken regularity of wind from one quarter, I was unable to ascertain whether it was influenced by continued courses of wind from different directions. The evening skies rarely present the red and yellow colours so common at sunset in England, but from their more perfect dryness preserve the grey and blue tints : a green tinge is sometimes very conspicuous.

Rain.

The summer months are usually dry ; a storm of rain occurring occasionally, accompanied by thunder and lightning. But about the middle or end of July a more steady and important fall occurs, and continues at intervals throughout August and the following months. Its occurrence yearly is pretty regular, and of great importance to the country. It commenced this summer on the 22nd of July, which is somewhat later than usual ; and the delay, though short, had begun to produce considerable uneasiness amongst the agriculturists and shepherds. The amount of rain which falls at Khelat is much less than that of Lus, Meckran, and the valleys of less altitude ; as the position of Khelat is much higher than the usual altitude of rain clouds, which seldom exceeds 4,500 feet.

Heavy storms occur in the hills and swell the mountain streams into torrents, when the sky here may be entirely free from any cloud. The inhabitants consider this fall of rain to presage the close of the summer and the commencement of the autumn season, and expect the heat to be greatly modified after its occurrence. And there is certainly a marked difference in the weather ; the nights become cold, and the air of the early mornings sharp and bracing ; the sky is more screened by clouds, and the mean temperature between sunrise and sunset reduced about 10°.

The rain appears to be connected with the south-west monsoon, as it annually occurs about its height ; but the winds which bring it do not come up from the south-west, but, crossing the Halla mountains, reach us from the east.

The southerly winds, saturated with moisture, sweeping over the southern part of Sind, impinge on the great mountain range running north by east, and meeting the colder air are condensed ; forming the masses of clouds which hang during these months almost continuously over the eastern flank of the range.

Probably the return current of the westerly wind, which blows so unvariedly over the mountain districts, may be the means by which the clouds are carried across the intervening space and thus reach us from the east.

Major M. Green informs me, that, in the Boogtee and Murree Hills, to the north of the Desert of Shikarpoor, the same phenomenon exists. The skies of Sind are generally clear and cloudless, but the heated currents of air from the south, on reaching these elevated masses, are gradually cooled, and their vapour condensed. This occurs in a very marked and gradual manner. At Gundava the sky is cloudy often for weeks together, further north and at a more elevated position, viz. at Dera (in the Boogtee Hills) slight rain occasionally falls; whilst at Kahun (in the Murree Hills) the fall of rain is heavy and continued.

In all these mountain districts the fall of rain is often very considerable in a short time, and the water draining off by a limited number of water sheds produces torrents, which suddenly rise, rush on for a time with great violence, and as suddenly cease. On the evening of the 24th of July, a heavy storm occurred at Khelat : in half an hour after its commencement a torrent of water rushed down the usually dry bed of the river, some thirty yards broad, and $2\frac{1}{2}$ to 3 feet deep : by the next morning the bed was again dry.

That the rain is usually or almost invariably accompanied by thunder storms is due to the same causes as the condensation of vapour mentioned above.

"The natural capacity of a body for electricity varies with changes in the extent of its surface. The capacity of steam and vapour for electricity therefore very greatly exceeds that of water from which the steam is evaporated. Thus, when evaporation takes place from the earth's surface, the vapour is combined with a vast quantity of electricity in a latent state. The condensation of the vapour into clouds diminishes its capacity, and a quantity of electricity is consequently set free surrounding the particles of mist. As the mist collects into drops, a further amount of electricity is liberated, and the intensity of its condition is increased, though the actual quantity of electric fluid remains the same."

*Dust Storms and Columns.*—Intimately connected with the subject of electricity, are the dust phenomena that occur so commonly in Sind and Cutchee, and in a less marked form in the hill-districts of Beloochistan. These may, I think, be considered under three heads, according to their intensity, viz. atmospheric dust, dust-columns and dust-storms.

1*st.* *Atmospheric Dust.*—There are certain days in which, however hard and violently the wind may blow, little or no dust accompanies it; whilst at other times every little puff of air or current of wind raises up and carries with it clouds of dust. At these times, the individual particles of sand appear to be in such an electrified condition that they are ever ready to repel each other, and are consequently disturbed from their position and carried up into the air with the slightest current. To so great an extent does this sometimes exist, that the atmosphere is positively filled with dust; and when accompanied by strong wind, nothing is visible at the distance of a few yards, and the sun at noon-day is obscured. It penetrates everywhere, and cannot be excluded from houses, boxes, or even watches, however carefully guarded.

This condition of atmosphere is evidently accumulative; it increases by degrees. There is a greater tendency for dust to rise, the wind is, perhaps, more liable to gusts and sudden increases in strength, until by degrees the climax is reached; when, after a certain time, usually about twenty-four hours, the atmosphere is cleared, and equanimity restored.

2*nd.* *Dust-Columns.*—Doubtless under a similar condition of electrical disturbance or intensity, though under some influence which causes it to assume a different aspect, dust-columns prevail. On calm quiet days, when hardly a breath of air is stirring, and the sun pours down its heating rays with full force, little circular eddies are seen to rise in the atmosphere near the surface of the ground; these increase in force and diameter, catching up and whirling round bits of stick, grass, dust, and lastly sand, until a column is formed of great height, and considerable diameter, which usually remains stationary for some time, and then sweeps away across country at great speed, and ultimately, losing gradually the velocity of its circular movement, dissolves and disappears.

In the valley of Mungochar, which is only a few miles across, and surrounded by high hills, on a day when not a breath of air stirred, I counted upwards of twenty of these columns. These seldom changed their places, or but slowly moved across the level tract; they never interfered with each other, and appeared to have an entirely unconnected existence.

At the times when this state of atmosphere existed, other signs of a redundancy of electricity were evident. The hairs in the tails of horses repelled each other, until the appendage resembled, in shape, a birch-broom or bottle-brush of large size; and at night, when flannel or other non-conducting substance was rubbed or touched, flashes of light were given off, or, on moving the blankets on a bed, broad bright flashes were seen. It also became almost impossible to brush the head, from the hairs being so greatly attracted by the brush as to follow it in its passage.

Humboldt speaks of them as seen in America thus:—"The singular phenomenon of these sandspouts, of which are seen something analogous on the cross roads of Europe, is especially characteristic of the Peruvian sandy desert between Amatope and Caquimbo. Such dense clouds of sand may endanger the safety of the traveller, who does not continuously avoid them. It is remarkable that these partial and opposing currents of air should only arise when there is a general calm. The aerial ocean resembles the sea in this respect, for here too we find that the small currents in which the water may frequently be heard to flow with a splashing sound, occur only in a dead calm."

They are called "Shaitans" or "Devils" by the Beloochees, who have a superstitious feeling with regard to them.

I believe that an uniformity in the course of the circular current prevails at certain times, that the most usual course is from right to left or from east round by north to west; and that it may yet be demonstrated that the direction depends on the character of the electricity engaged. That it is totally unconnected with the general direction of the wind and dependent on atmospherical electricity, hardly admits of a doubt. It may, perhaps, be ultimately referred to electro-magnetism. The following experiment on the rotation of horizontal currents may give some idea of the connection of the subject with that science.

A figure of the apparatus used is given in the 2nd vol. of Noad's Manual of Electricity.—It consists of a copper dish filled with dilute sulphuric acid, in the centre of which a horizontal wire, terminated with two balls, is balanced on a fine point; from near the ends of this wire, two short wires drop vertically into the acid. On causing the voltaic current to pass in a contrary direction, through the two halves of the wire a continuous rotatory movement is established. The rotation is from east to west when the current passes from the centre to the circumference, and from west to east when it moves from the circumference to the centre of the wire.

Sir Bartle Frere mentioned to me an incident which bears on the subject in hand, and which I had an opportunity subsequently of verifying. He stated that an Engineer Officer had remarked more than once on the occasion of the rise of the River Indus and consequent flow of water through the canal which supplies the water for irrigation in Upper Sind, that a huge dust-column preceded the onward rolling wave for miles until it disappeared in the distance.

On the 13th of April, the Indus having risen sufficiently, the water flowed up the canal and reached Jacobabad about 5 P.M. Preceding it, about a quarter of an hour, a vast pillar of dust moved slowly along and crossed the cantonment, the sky was dark and cloudy, thunder muttered in the distance, and a slight shower of rain fell—distant lightning was observed all night. This was followed by an immediate and very considerable fall in the thermometer; and the weather which before had been excessively sultry and oppressive became pleasant and agreeable, and the nights as cool as they had been a month previously. How far this was due to the arrival of the water I am unable to determine; but that a decided electrical disturbance was caused was apparent.

So little have these phenomena been inquired into that I am unable to offer any explanation *how* a body of water thus forcing its way over a *perfectly dry surface*, should excite a disturbance in the atmospherical electricity—probably it is dependent on either condensation or friction. That condensation of vapour is the principal cause or most productive source of the electricity

of the atmosphere is now generally admitted; but it appears difficult to understand, how so small a body of water should condense the air in its course sufficiently to produce the phenomena above stated.

On the other hand, friction is a most ready and powerful source; and electricity of very high tension may be produced by a jet of steam (*i. e.* water in a state of division) striking against a rough surface.

Bakewell's Manual.

"That the excitement of electricity by effluent high-pressure steam is caused by the friction of condensed water against the jet from which the steam issues, has been shown also by this apparatus (the hydro-electric machine), for when the jet and the pipe leading to it were heated so as to prevent the condensation of the steam before it issued forth, scarcely any electrical effects were produced. The amount of electricity was increased by lengthening the pipe so as to cause greater condensation." * * * "One of the many curious results derived from these experiments is, that water may claim to rank among the first positive electrics. Faraday, indeed, conjectures that further investigations will place it at the head of all substances as a positive electric; for even glass became negatively electrical when exposed to friction with the emitted steam of pure water."

I have mentioned these subjects more with the view that attention might be directed to them, than with any hope of being instrumental in elucidating them; but without the aid of efficient instruments and means of working them, little can be done.

3*rd*. *Dust-Storms*.—I have not had an opportunity of witnessing many well-marked Sind dust-storms, but I will describe, shortly, one that took place at Jacobabad in April.

The preceding weather had been hot and oppressive, with but little or no breeze, and an evident tendency for dust to accumulate in the atmosphere. This evening, heavy clouds gathered and covered the sky; about 9 P.M., the sky had cleared somewhat, and the moon shone brightly. A breeze sprang up from the west; this increased in force, and bore along with it light clouds of sand. About half-past nine, the storm commenced in all its fury; vast bodies of sand were drifted violently along; the

stars, moon, and sky were totally obscured; it became pitchy dark, and it was impossible to see the hand held close to the face; the wind blew furiously and in gusts, and heaped the sand on the windward side of obstacles in its course. Thunder and lightning accompanied it, and were succeeded by heavy rain. The storm lasted about an hour, when the amount of dust gradually decreased until it entirely subsided. The sky again became visible, and the moon shone brightly, although the wind continued to blow hard for some time subsequently.

The storm appeared to have entirely relieved the electrical condition of the atmosphere; a pleasant freshness succeeded, and the oppressive sensation before mentioned was no longer experienced.

This, indeed, is the general effect of such dust-storms in Upper Sind, the air is cooled, the atmosphere cleared, and the state of chronic dust-storm which usually precedes them for some days, entirely relieved.

These dust-storms are, doubtless, closely analogous to the tornadoes of the Indian seas; but I am not aware whether a circular current of the wind has been demonstrated; if so, they are nothing more than a dust-column on a gigantic scale.

They are frequently very much more severe than the one I have described, lasting for many hours, and obscuring the sun's light at mid-day to such a degree that artificial light is necessary. If the unfortunate traveller is caught in one in the desert, he not unfrequently loses his life.

They are described by Humboldt as occurring in the sandy deserts of Peru. They occur also in the deserts of Arabia, Mesopotamia, Syria, Nubia, &c. &c.

They occur, to a certain extent, throughout Sind, but it is in the centre of the desert-tract that their full violence is chiefly seen.

Irrigation and cultivation would probably influence the climate of a district, when thorough and continued, especially in reference to its electrical condition, but the good results are exceedingly tardy in operation, and the increase of cultivation on an extended scale is such a lengthened process that we can hardly hope for any great amelioration in the condition of the climate of Upper Sind.

On the table-land of Beloochistan, dust-storms are rarely seen, and always in a mitigated form; but the phenomena in reference

to the electrical disturbance of the atmosphere are to be ranged under the first two heads I have mentioned.

*Simoom or Poisonous Winds.*—I can hardly close this meteorological sketch without mentioning the Simoom, that deadly wind which occasionally visits the deserts of Cutchee and Upper Sind, in common with similarly constituted tracts of country in the east.

Sudden and singularly fatal in its occurrence, invisible, intangible and mysterious, it has ever been the dread of the desert traveller.

Its *nature* alike unknown (as far as I am aware) to the wild, untutored inhabitant of the country it frequents as to the European man of science,—its *effects* only are visible, its presence made manifest in the sudden extinction of life, whether of animal or vegetable over which its influence has extended, like the deadly stroke of that Angel's wings who smote of old the Assyrian hosts.

Thus constituted, it may appear futile to attempt to analyse it, or attribute it to any known phenomenon of nature, and doubtless it is a difficult subject to handle, an intricate one to search through.

But inasmuch as it is undoubtedly to be referred to material causes, and is a sequence of some combination of one or more of those four all-prevalent elements—carbon, oxygen, hydrogen, and nitrogen,—or to be ultimately referred to some known agent, such as electricity, magnetism, &c., it may be well to make some few inquiries concerning it, which, although perhaps doing but little in defining its nature, may serve to draw attention to the subject.

Lieutenant Postans mentions it briefly in his report on Shikarpoor, submitted to Government in 1840, as occurring in the district of Cutchee.

At the close of the hot weather in 1856, a party of five men were crossing the Put of Shikarpoor, being on their way from Kandahar to that city; the blast unfortunately crossed their path; killed, if I recollect rightly, three of them, and disabled the remaining two.

In the year 1851 during one of the hot months, certain officers of the Sind Horse were sleeping by night on the top of

General Jacob's house at Jacobabad. They were awakened by a sensation of suffocation and an exceedingly hot oppressive feeling in the air, while at the same time a very powerful smell of sulphur was remarked to pervade the atmosphere.

On the following morning, a number of trees in the garden were found to be withered in a very remarkable manner. It was described as if a current of fire, above 12 yards in breadth, had passed through the garden in a perfectly straight line, singeing and destroying every green thing in its course. Entering on one side and passing out on the other, its track was as defined as the course of a river.

The Moonshee of Major Henry Green, Honorary A.D.C. to the Governor General and Political Agent at Khelat, is a native of Bhag in Cutchee, and gave the following description of the effects of one of these blasts, of which he was both the eye-witness and sufferer. He was travelling in company with two others near Chilgherry, the site of a buried city in Cutchee, about seven miles S.E. of Bhag :—they were all mounted. About 2 A.M. the blast struck them. He was sensible of a scorching sensation in the air like the blast of an oven, but remembers nothing further, as all three were immediately struck to the earth. They were carried to Bhag where every attention was afforded them, and they ultimately, after some days of sickness, recovered.

He states that such phenomena are frequent in the desert; that the hot blast is generally preceded by a cold current of air; that it destroys every green thing in its course, and is most frequently fatal to human life. That the bodies of the dead quickly decompose, their flesh is withered, its firmness and consistency destroyed, so that it falls or may be plucked off from the bones; and this, not after decomposition has commenced, but immediately on death taking place.

The treatment they adopt is, at once to wrap up the sufferer in a poshteen or warm woollen clothes, and to administer a mixture of onions and pepper with the view of inducing perspiration; as soon as this is established the hope of recovery returns.

The current passes "like a knife" through the air, leaving a well-defined narrow track.

During the past hot season, many (upwards of 15) lives have been lost in the desert to the N.W. of Jacobabad. Many of these may undoubtedly be attributed to sun-stroke, but that the following is a well-marked case of the effects of the simoom admits of little doubt.

Two Syces with two camels were sent to Minooti (20 miles to the N.W. of Jacobabad) for grass. Not returning at the proper time, it was feared that some accident had happened, and search was made. All four bodies were found lying together in one spot, perfectly dead. Their death had been evidently instantaneous.

Now had this been sun-stroke, one or even both men might have been killed, but the sun (as far as I am aware) has never been known to have killed camels; and the fact of their all lying in one spot, killed at the same moment, evidently points to something beyond the power of a coup-de-soleil.

We may glean then the following items of information respecting it:—

1*st.* It is sudden in its attack.
2*nd.* It is sometimes preceded by a cold current of air.
3*rd.* It occurs in the hot months (usually June and July).
4*th.* It takes place by night as well as by day.
5*th.* Its course is straight and defined.
6*th.* Its passage leaves a narrow "knife-like" track.
7*th.* It burns up or destroys the vitality of animal and vegetable existence in its path.
8*th.* It is attended by a well-marked sulphurous odour.
9*th.* It is described as being like the blast of a furnace, and the current of air in which it passes is evidently greatly heated.
10*th.* It is not accompanied by dust, thunder, or lightning. If it be then, neither a phase of sun-stroke, lightning, malaria or miasmata in a concentrated form,—and who would believe that it is?—what is it? or to what is it to be referred?

I believe that it will be found to be a very concentrated form of *Ozone,* generated in the atmosphere by some intensely marked electrical condition.

If we inquire into the character of this element, the truth of this conjecture may, I think, be more apparent.

Professor Hunt states in his "Poetry of Science:"—

"The recent researches of Schönbein have shown that a peculiar body which has been regarded as a peroxide of hydrogen, to which he has given the name of "Ozone," is produced at the same time, and that it is developed in a great way, particularly during electrical changes of the atmosphere.

"During the excitation of an electrical machine, or the passage of a galvanic current through water,—by the oxidation of phosphorus and probably in many similar processes, in particular those of combustion, and, we may therefore infer, also of respiration,—this body is formed. From observations which have been made it would appear that, during the night, when the activity of plants is not excited by light, they act upon the atmosphere in such a way as to produce this ozone; and its presence is said to be indicated by its peculiar odour during the early hours of morning. We are not yet acquainted with this body sufficiently to speculate on its uses in Nature; without doubt they are important, perhaps second to those only of water. It is probable that *ozone* may be the active agent in removing from the atmosphere those organic poisons to which many forms of pestilence are traceable, and it is a curious fact that a low electrical intensity and a consequent deficiency of atmospheric ozone, marks the prevalence of cholera, and an excess distinguishes the reign of influenza."

"Some interesting researches appear to show that ozone is simply oxygen in a state of high activity."

Becquerel has proved that this ozonous state may be produced in dry oxygen by passing a succession of electric sparks through it.

"Fremy passed the electric sparks on the outside of a tube which contained perfectly dry oxygen, and it was found to have acquired the properties of ozone. This ozone, or this peculiar oxygen, always exists in the air we breathe; but its *quantity is subject to great and rapid variations.* It is found that when electrical intensity is high, the quantity of this principle is great; when the electrical intensity is low, as in cholera years, the proportion of ozone is relatively low."

Noad, in vol. 1st, gives the characteristics thus :—

"It bleaches, without reddening, blue litmus paper; it decolorises a solution of indigo; it is instantly destroyed by most metals, even silver is converted into oxide; phosphorus is oxidized by it into phosphoric acid; iodine into iodic acid; sulphurous and nitrous acids into sulphuric and nitric; it decomposes and is destroyed by sulphuretted and carbonetted hydrogen; it instantly liberates iodine from iodide of potassium, hence iodized starch-paper is the best test for it; it is instantly destroyed by most animal and vegetable substances."

"*Ozonized air is poisonous*, acting on the system like chlorine. A mouse speedily perishes when immersed in a jar impregnated with it."

"Ozone is *set free and continuously developed* in the atmosphere by the *disturbance of the natural electrical equilibrium* and by *atmospheric electricity*, and this principle would *probably accumulate to an injurious extent* but for its continual removal by oxidizable substance, organic matters, &c."

Doctor Brewer says, "near a large electrical machine in good action, there is always a peculiar odour resembling sulphur and phosphorus; this odour is ozone."

"If the gaseous body, disengaged by lightning, reaches us in a concentrated form, the odour is sulphurous; if in a more diluted form it is phosphorous."—*Glover's Chemistry.*

"When air much charged with ozone is inspired, it becomes highly poisonous: small animals put into it die; and it acts as a powerful irritant to the air passages. As ozone, a colourless gas, is chiefly recognised by this property, it has led to some curious speculations. By many, its presence in excess or diminution is supposed to be capable of explaining many conditions of the air which produce disease. Its smell is precisely similar to what is produced when a powerful electro-pneumatic machine has been long worked, and it is said that the operators in such cases experience symptoms not dissimilar to those of influenza."*

* *Vide* the works of Bakewell, Noad, Hunt, Brewer, Fownes, Hoblyn, Glover, &c. &c.

We see therefore from the foregoing extracts—

1*st*.—That ozone is set free in the atmosphere by electrical changes; that its quantity is subject to great and rapid variations; that it is constantly supplied by atmospheric electricity; and that, unless again abstracted, it is liable to accumulate to a dangerous extent. Now, by what means, is it again abstracted? By oxidizable substances, organic matters, &c. If, therefore, we imagine a condition of climate and country where there is usually a vast amount of electrical disturbance and but a very limited amount of organic life, we should have just the conditions which would cause this gas to be generated and to accumulate.

Are not such conditions of climate and country to be found in the deserts of Cutchee, Arabia, Mesopotamia, Nubia, &c. where the simoom is prevalent?

2*ndly*.—That it is, when thus accumulated, highly destructive to animal and vegetable life, destroying the colour, texture, and consistency of organic bodies.

3*rdly*.—That it is as likely, or more likely, to occur by night than by day.

4*thly*.—That it is attended by a peculiar and very powerful sulphurous odour.

We have, I think, only to suppose such an accumulative electrical state as I have before described when speaking of dust-storms,—some peculiar condition of the atmosphere favouring the sudden generation of ozone in large quantities, or of its accumulation at certain points,—then, after being thus concentrated, set in motion by electrical conditions similar to those which produce the sudden currents of air or driving pillars of dust, &c. (phenomena so common in these districts), and in the shape of an invisible pillar driving violently over the level districts,—and what is to prevent its producing effects as terrible as those usually ascribed to the poisonous wind,—death, destruction of texture, and desolation?

As before stated, I have no wish to pretend to having *solved* this difficult question; but if I have been able to throw any light on the intricate problem, or even to call the attention of others, far better fitted to accomplish such a task than myself, to the subject, I shall not have mooted the question entirely in vain.

Meteorological Register for

| Station. | Dates. | Maximum. | Night. | | 9 A.M. | | 1 P.M. | | 7 P.M. | | 10 A.M. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | |
| | May | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° |
| Bhag .. | 1 | 107 | 69 | .. | 85 | .. | 107 | .. | 98 | .. | 29·250 |
| | 2 | 124 | 74 | 60 | 94 | 66 | 122 | 84 | 100 | 77 | 29·250 |
| | 3 | 121 | 76 | 63 | 100 | 80 | 118 | 85 | 98 | 75 | 29·250 |
| | 4 | 122 | 71 | 59 | 105 | 83 | 121 | 89 | 102 | 80 | 29·225 |
| | 5 | 126 | 75 | 63 | 112 | 88 | 126 | 97 | 101 | 80 | 29·020 |
| | 6 | 118 | 80 | 63 | 109 | 92 | 115 | 79 | 111 | 73 | 29·150 |
| Hajikeshire Mitnee .... | 7 | 108 | .. | .. | 100 | 65 | 105 | 68 | 98 | 65 | 29·100 |
| | 8 | 108 | .. | .. | 95 | 63 | 106 | 66 | 96 | 62 | 29·100 |
| | 9 | 103 | 64 | 54 | 90 | 66 | 100 | 69 | 86 | 65 | 29·150 |
| | 10 | 108 | 67 | 53 | 95 | 68 | 108 | 74 | .. | .. | 29·100 |
| | 11 | 114 | 69 | 55 | 100 | 70 | 113 | 74 | 92 | 65 | 29·100 |
| | 12 | 118 | 70 | 58 | 105 | 75 | 116 | 74 | 92 | 65 | 29·025 |
| | 13 | 118 | 79 | 66 | 100 | 75 | 118 | 83 | 93 | 73 | 29·025 |
| | 14 | 118 | 95 | 70 | 103 | 81 | 115 | 81 | 96 | 75 | 29·050 |
| | 15 | 116 | 82 | 65 | 100 | 73 | 112 | 78 | 96 | 74 | 29·025 |
| | 16 | 119 | 93 | 62 | 102 | 71 | 111 | 71 | 100 | 70 | 29·025 |
| Dadur .. | 17 | 120 | 80 | 66 | 107 | 79 | 114 | 82 | 92 | 74 | 29·025 |
| | 18 | 116 | 76 | 66 | 102 | 76 | 112 | 83 | 101 | 70 | 29·000 |
| | 19 | 110 | 72 | 64 | 97 | 79 | 109 | 83 | 97 | 74 | 28·970 |
| | 20 | 116 | 79 | 72 | 102 | 80 | 113 | 86 | 98 | 81 | 28·920 |
| | 21 | 115 | 79 | 63 | 106 | 80 | 107 | 68 | 99 | 67 | 28·900 |
| | 22 | 117 | 80 | 64 | 106 | 77 | 117 | 79 | 101 | 71 | 29·000 |
| | 23 | 116 | 79 | 62 | 101 | 72 | 113 | 75 | 94 | 71 | 28·970 |
| | 24 | 115 | 81 | 67 | 100 | 71 | 115 | 78 | 95 | 72 | 29·000 |
| | 25 | 115 | 75 | 65 | 96 | 75 | 115 | 77 | 95 | 68 | 28·920 |
| | 26 | 115 | .. | .. | 97 | 77 | 111 | 78 | .. | .. | 29·000 |
| Kondilani . | 27 | 117 | .. | .. | 109 | 74 | 117 | 76 | 107 | 69 | 28·800 |
| Kirta .... | 28 | 121 | .. | .. | 110 | 75 | 120 | 78 | 105 | 69 | 28·570 |
| Beebee Nanee . | 29 | 122 | .. | .. | 112 | 70 | 121 | 76 | 113 | 73 | 28·400 |
| Abigoom .. | 30 | 108 | .. | .. | 100 | 60 | 108 | 68 | 99 | 67 | 28·225 |
| Sir-i-Bo-lan .. | 31 | 101 | .. | .. | 96 | 66 | 100 | 68 | .. | .. | .. |

the Month of May 1859.

| Barometer. 1 P.M. | Barometer. 5 P.M. | Water Boils. | Mean of 24 H. Dry. | Mean of 24 H. Wet. | Remarks. |
|---|---|---|---|---|---|
| ° | ° | ° | ° | ° | |
| 29·275 | 29·225 | 210·9 645ft. | 89·75 | .. | Day 1 No breeze; sky clear. |
| 29·225 | 29·175 | .. | 97·50 | 71·75 | 2 Ditto ditto. |
| 29·200 | 29·150 | .. | 98·00 | 75·75 | 3 Strong Northerly breeze; sky clear. |
| 29·200 | 29·161 | .. | 99·75 | 77·75 | 4 Hot winds, which continued until 12 P.M. |
| 29·175 | 29·125 | .. | 103·50 | 82·00 | 5 Little or no breeze. |
| 29·125 | 29·075 | .. | 103·75 | 76·75 | 6 Furious wind from North, accompanied with dust, from 8 A.M. till midnight. |
| 29·100 | 29·075 | .. | .. | .. | 7 Strong wind from North, with occasional dust; hazy or cloudy or thick. |
| 29·125 | 29·100 | .. | .. | .. | 8 Strong breeze from North during the day. |
| 29·125 | 29·100 | 210·8 700ft. | 85·00 | 63·50 | 9 Strong breeze, from 8 A.M. till noon, from S.W. |
| 29·125 | 29·075 | .. | 93·50 | 66·00 | 10 Ditto ditto ditto. |
| 29·050 | 29·000 | .. | 93·50 | 66·00 | 11 No breeze. |
| 28·970 | 28·920 | .. | 95·75 | 68·00 | 12 Breeze at mid-day, from S.E.; light cumuli to the N. Heavier in the evening, and apparently rain on the mountain. |
| 29·000 | 28·950 | .. | 97·50 | 74·25 | 13 Wind westerly, cumuli to the N.; dark clouds and rain over the mountain at evening. |
| 29·025 | 28·950 | .. | 102·25 | 76·75 | 14 Heavy clouds all day over the mountains to W.; wind from E. and S.E. during the afternoon; hot wind all night from the mountains to W. and N.W. |
| 29·000 | 28·925 | .. | 97·50 | 72·50 | 15 Cumuli to the N.W.; distant thunder from 2 P.M. till 5 P.M.; rain on mountains at evening; breeze from S.E. during the day. |
| 28·970 | 28·920 | .. | 101·50 | 68·50 | 16 Sky clear; hot wind from N., from 9 A.M. till 5 P.M.; hot winds from N.W. at 7 P.M.; hot wind at night. |
| 28·970 | 28·920 | .. | 98·25 | 75·25 | 17 Breeze from S.E. at noon. Heavy clouds to N. & N.W. |
| 28·970 | 28·920 | .. | 97·75 | 73·75 | 18 Strong wind from N., from 9 A.M. till 5 P.M.; light cumuli to the N. Thermometer 100 at 9 P.M. |
| .. | 28·900 | .. | 93·75 | 74·75 | 19 Strong wind, with dust, from 9 A.M. till 5 P.M.; sky clear. |
| 28·900 | 28·820 | .. | 98·00 | 79·75 | 20 9 A.M. Slight breeze from N. 4 P.M. Strong from North; sky clear. |
| 28·880 | 28·870 | .. | 100·25 | 69·50 | 21 9 A.M. Slight breeze from S. Dust storm at 2 P.M.; and wind changing to N.W. at 3 P.M. 5 P.M. Dark heavy clouds to E. 7 P.M. Hot winds. |
| 28·970 | 28·920 | .. | 101·00 | 72·25 | 22 Slight fall of rain last night. Noon. Slight breeze from S. 6 P.M. Dust storm. |
| 28·950 | 28·870 | .. | 96·75 | 70·00 | 23 9 A.M. Slight breeze from S. Noon. Breeze from S. Evening. Still hot. |
| 28·970 | 28·900 | .. | 97·75 | 72·00 | 24 Southerly breeze all the day. |
| 28·900 | 28·850 | .. | 95·25 | 71·25 | 25 Heavy clouds at day-break, rain over mountains. Furious dust-storm at 11 A.M., after which the sky cleared. Evening. Breeze from South. |
| 28·970 | 28·920 | .. | .. | .. | 26 Slight breeze from South during the day; sky clear. |
| 28·770 | 28·750 | .. | .. | .. | 27 Slight breeze from South-West; sky clear. |
| 28·540 | 28·470 | 210·00 1215ft. | .. | .. | 28 Breeze from South. |
| 28·370 | 28·350 | .. | .. | .. | 29 Strong breeze from South during the day; sky clear. |
| 28·200 | 28·120 | 207·0 3000ft. | .. | .. | 30 Strong breeze from S.E.; cumuli to the N.; barometer erroneous. |
| .. | .. | 204·5 1075ft. | .. | .. | 31 Aneroid barometer ceases entirely to be correct. |

| | Dry. | Wet. | Difference. |
|---|---|---|---|
| Mean maximum during the month.... | 115·22 | .. | .. |
| Mean minimum ..... | 76·73 | 62·72 | 14·01 |
| Mean of day and night ..... | 96·82 | 72·22 | 24·60 |
| Extreme maximum ..... | 126·00 | .. | 62·00 |
| Extreme minimum ..... | 64·00 | | |

Days on which rain fell, one; quantity very trifling: prevailing winds, Southerly.

P S.—The various omissions were caused when marching by night; the instrument being sent on the previous evening.

## Meteorological Register for

| Station. | Date. | Maximum. | Night. | | Sunrise. | | 9 A. M. | | 1 P.M. | | 7 P. M. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. |
| | June | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° |
| Mohbee .. | 1 | 108 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 2 | 105 | .. | .. | .. | .. | 89 | 60 | 102 | 66 | 82 | 55 |
| Mustoong . | 3 | 99 | 57 | 43 | 57 | 44 | 85 | 55 | 94 | 60 | 77 | 54 |
| | 4 | 96 | 53 | 42 | 54 | 43 | 82 | 55 | 94 | 60 | 76 | 53 |
| | 5 | 100 | 53 | 42 | 53 | 43 | 83 | 53 | 97 | 63 | 80 | 55 |
| | 6 | 100 | 51 | 42 | 52 | 40 | 82 | 58 | 97 | 62 | 80 | 58 |
| | 7 | 103 | 60 | 45 | 64 | 63 | 80 | 62 | 100 | 64 | 85 | 63 |
| | 8 | 104 | 64 | 57 | 67 | 58 | 85 | 67 | 102 | 67 | 83 | 64 |
| | 9 | 108 | 63 | 50 | 64 | 51 | 89 | 66 | 106 | 70 | 89 | 69 |
| | 10 | 109 | 73 | 64 | 75 | 66 | 90 | 71 | 106 | 73 | 90 | 70 |
| | 11 | 103 | 69 | 60 | 72 | 62 | 89 | 67 | 101 | 71 | 78 | 65 |
| | 12 | 103 | 64 | 57 | 65 | 57 | 87 | 68 | 102 | 71 | 86 | 68 |
| | 13 | 96 | 67 | 59 | 69 | 60 | 91 | 71 | 96 | 73 | 77 | 70 |
| | 14 | 102 | 72 | 66 | 73 | 67 | 83 | 71 | 101 | 73 | 84 | 70 |
| | 15 | 106 | 70 | 65 | 70 | 66 | 85 | 71 | 105 | 75 | 85 | 70 |
| | 16 | 101 | 69 | 63 | 70 | 64 | 88 | 71 | 101 | 76 | 82 | 68 |
| | 17 | 103 | 73 | 63 | 73 | 64 | 89 | 74 | 103 | 77 | 76 | 70 |
| Mohbee .... | 18 | 99 | .. | .. | .. | .. | 80 | 68 | 98 | 74 | 90 | 72 |
| Sir-i-Ali .. | 19 | 95 | .. | .. | .. | .. | 94 | 73 | 89 | 70 | 74 | 68 |
| | 20 | 94 | .. | .. | .. | .. | .. | .. | 92 | 70 | 81 | 66 |
| | 21 | 99 | 71 | 64 | 71 | 64 | 80 | 66 | 98 | 71 | 82 | 62 |
| | 22 | 92 | 60 | 47 | 61 | 47 | 81 | 55 | 92 | 61 | 80 | 60 |
| | 23 | 99 | 57 | 45 | 57 | 46 | 81 | 61 | 98 | 67 | 82 | 60 |
| | 24 | 96 | 49 | 40 | 50 | 41 | 83 | 60 | 95 | 66 | 81 | 57 |
| Burg ..... | 25 | 96 | .. | .. | .. | .. | .. | .. | 94 | 60 | 81 | 56 |
| Karnac .. | 26 | 96 | .. | .. | .. | .. | .. | .. | 95 | 66 | 80 | 60 |
| | 27 | 102 | 50 | 43 | 51 | 43 | 81 | 56 | 101 | 67 | 78 | 58 |
| | 28 | 100 | 51 | 40 | 51 | 40 | 83 | 62 | 100 | 67 | 77 | 58 |
| | 29 | 100 | 50 | 40 | 50 | 40 | 80 | 58 | 99 | 68 | 79 | 59 |
| | 30 | 98 | 50 | 41 | 50 | 41 | 80 | 57 | 96 | 63 | 80 | 60 |

the Month of June 1859.

| Evaporation. | Rain. | Water Boils. | Mean between Sunrise and Sunset. Dry. | Wet. | Remarks. |
|---|---|---|---|---|---|
| ° | ° | ° | ° | ° | |
| .. | None. | 202·0 5,800 ft. | .. | .. | 1 Breeze from S. during the day; sky clear. 2 Strong wind from S. W., with dust; sky clear. Dew point 65° below temperature of atmosphere. 3 Strong breeze from West, not accompanied by dust; sky clear. 4 Breeze from W. from noon till evening; sky clear. 5 Light breeze from S. W.; sky clear. 6 Strata at sunset to W.; light breeze from W. during the day. 7 Slight westerly breeze during the day; sky clear. Breeze from N. E. at 8 P. M. |
| .. | .... | .... | .. | .. | 8 Slight breeze from W. going round to N.E. at sunset; cum. and cumulo strata in E. towards evening. |
| .. | .... | 202·2 5,700 ft. | 78 25 | 53·25 | 9 Strong breeze from East, from 3 P. M. till night, with slight dust; morning close and hot. |
| 0·50 | .... | .... | 76·50 | 52·75 | 10 Morning. Strong breeze, with dust, from N. E.; dust storm from E. at 3 P. M. |
| 0·42 | .... | .... | 78·25 | 53·50 | 11 Slight breeze from West in morning; dust storm from East at 3½ P. M.; cloudy, with distant thunder. |
| 0·39 | .... | .... | 77·75 | 54·25 | 12 Strong breeze from N. from noon till sunset; sky clear at 7 P. M. Cumuli to the North. |
| 0·43 | .... | .... | 82·25 | 60·50 | 13 Sunrise. Cumuli to the East. 1 P. M. Cumuli strata, East; distant heavy thunder, followed by a dust storm and rain. 7 P.M. Sky overcast. |
| 0·40 | None. | .... | 84·25 | 64·00 | 14 9 A.M. Strata to E; air feels moist and soft. Cumuli strata to east at noon, followed by dust storm, with thunder; strong breeze from E. till night. |
| 0·42 | .... | .... | 87·00 | 64·00 | 15 4 P. M. Strong breeze from East. 7½ P. M. Dust columns, slight rain, strong wind from till 8½ P. M. |
| 0 39 | .... | .... | 90·25 | 70·00 | 16 No wind till 4 P.M., when easterly breeze set in followed by dust storm; distant thunder 7 P.M.; sky overcast; rain to West. |
| 0·38 | .... | .... | 85·00 | 66·00 | 17 12 A. M. Strong dust storm from East; heavy thunder storm with dust at 5 P. M. from S. W., continuing till night. 9 P. M. Rain lasting some hours. |
| 0·35 | .... | .... | 85·00 | 66·00 | 18 11 A. M. Breeze from S E. 5 P.M Breeze from N.E.; a few cirri strata; breeze fresh and cool. |
| 0·36 | 22 | .... | 83·25 | 68·50 | 19 1 P. M. Nimbus to N. E.; shower of rain with thunder, wind from N.W. 4 P.M. Storm of rain with thunder from S. |
| 0·20 | None. | .... | 85·25 | 70·25 | 20 Sunrise. Full clouds covering the hills. Noon. Breeze from W. 4 P.M. Nimbi and cumuli to E., with distant thunder; air cold and fresh. |
| 0·28 | Slight shower. | .... | 86·25 | 70·50 | 21 Sunrise. Full clouds. 11 A.M. Breeze from W. Noon. Breeze from North-West; sky clear. |
| 0·33 | .... | .... | 85·25 | 69·75 | 22 Sunrise. Sky clear. 9 A.M. Breeze from West. Noon. Strong breeze, W.S.W, till evening. |
| 0·35 | Heavy rain. | .... | 89·25 | 73·60 | 23 Sunrise. Sky clear. Noon. Slight breeze from S.W.; sky clear. |
| .. | None. | .... | .. | .. | 24 Sunrise. Sky clear. 11 A.M. Gentle breeze from N.W. P. M. Sky clear. |
| .. | Two slight showers. | .... | .. | .. | 25 Sunrise. Sky clear. 10 A.M. Strong wind from S. till evening. P.M. Sky clear. |
| .. | Rain last night. | .... | .. | .. | 26 Sunrise. Sky clear. A.M. Breeze from W. P.M. Ditto; sky clear; several dust columns. |
| .. | Shower at night. | 201·9 5,900 ft | 82·75 | 65·75 | 27 Sunrise. No breeze during the day; many dust columns in various directions. |
| 0·35 | None. | .... | 78·50 | 55·90 | 28 Ditto; ditto. |
| 0·32 | .... | .... | 79·50 | 58·50 | 29 Sunrise. Sky clear. 11 A.M. Strong wind. |
| 0·32 | .... | .... | 77·25 | 56·00 | 30 Sunrise. Sky clear. 11 A.M. Strong breeze from W. 2 P. M. Furious dust storm or column. P. M. Breeze from W.; sky clear. |
| .. | .... | .... | .. | .. | |
| .. | .... | 202·6 5,514 ft. | .. | .. | |
| .. | .... | .... | 77·75 | 56·00 | |
| .. | .... | .... | 77·75 | 56·75 | |
| .. | .... | .... | 77·75 | 56·25 | |
| .. | .... | .... | 76·50 | 54·50 | |

| | Dr. blb. | Wt. blb. | Diff. |
|---|---|---|---|
| Mean max. during the month.. | 100·4 | .. | .. |
| Mean minimum ..... ..... | 60·65 | 51·13 | 9·52 |
| Mean bet. sunrise and sunset .. | 82·10 | 62·0 | 20·10 |
| Extreme maximum ..... ... | 109·0 | .. | 60·0 |
| Extreme minimum ..... | 49·0 | | |
| Mean daily evap. in cents .... | 36·56 | .. | .. |

Days on which rain fell, 6, quantity inconsiderable; prevailing winds, W.

## Meteorological Register for

| Station. | Date. | Maximum. | Night. | | Sunrise. | | 9 A.M. | | 1½ P.M. | | 7 P.M. | | Evaporation. | Rain. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet | | |
| | July | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° |
| Karnac .. | 1 | 95 | 50 | 39 | 50 | 39 | 82 | 58 | 95 | 61 | 80 | 56 | .. | None. |
| Tiree .... | 2 | 105 | .. | .. | .. | .. | 83 | 62 | 104 | 62 | 83 | 65 | .. | .. |
| | 3 | 102 | .. | .. | .. | .. | 83 | 64 | 98 | 65 | 82 | 67 | .. | .. |
| Mustung. | 4 | 103 | 67 | 60 | 67 | 60 | 83 | 67 | 102 | 68 | 87 | 70 | 40 | .. |
| | 5 | 100 | 64 | 57 | 64 | 57 | 87 | 66 | 100 | 66 | 82 | 64 | 32 | .. |
| | 6 | 96 | 67 | 54 | 67 | 54 | 87 | 63 | 94 | 54 | 85 | 58 | 38 | .. |
| Animula .. | 7 | 92 | .. | .. | .. | .. | 81 | 54 | 91 | 60 | 77 | 56 | .. | .. |
| Gooroo .. | 8 | 100 | .. | .. | .. | .. | 88 | 59 | 99 | 66 | 78 | 56 | .. | None. |
| | 9 | 100 | .. | .. | .. | .. | .. | .. | 99 | 67 | 82 | 66 | .. | .. |
| Mungochar .... | 10 | 100 | 60 | 56 | 60 | 56 | 87 | 67 | 94 | 65 | 85 | 65 | .. | .. |
| | 11 | 100 | 62 | 56 | 62 | 55 | 90 | 68 | 99 | 70 | 86 | 65 | 42 | .. |
| | 12 | 97 | .. | .. | .. | .. | .. | .. | 95 | 67 | .. | .. | .. | .. |
| | 13 | 95 | 57 | 50 | 57 | 50 | 91 | 65 | 94 | 65 | 81 | 58 | .. | .. |
| Girani .. | 14 | 103 | 49 | 40 | 49 | 40 | 92 | 67 | 102 | 70 | 84 | 60 | .. | .. |
| | 15 | 102 | 50 | 40 | 50 | 40 | 97 | 70 | 101 | 73 | 84 | 65 | 41 | None. |
| | 16 | 95 | 59 | 54 | 59 | 54 | 93 | 74 | 94 | 69 | 80 | 62 | 40 | .. |
| | 17 | 95 | .. | .. | .. | .. | .. | .. | 94 | 70 | 75 | 60 | . | .. |
| | 18 | 95 | 59 | 51 | 59 | 52 | 88 | 70 | 95 | 71 | 75 | 65 | .. | .. |
| | 19 | 101 | 57 | 52 | 57 | 53 | 88 | 70 | 100 | 70 | 76 | 63 | 25 | .. |
| | 20 | 90 | 57 | 47 | 57 | 47 | 86 | 64 | 89 | 64 | 78 | 60 | 27 | .. |
| | 21 | 89 | 65 | 54 | 65 | 54 | 80 | 66 | 88 | 64 | 79 | 61 | 34 | .. |
| | 22 | 87 | 65 | 60 | 65 | 60 | 80 | 65 | 85 | 61 | 75 | 66 | 24 | Slight shower. 2 |
| Khelat.. | 23 | 91 | 66 | 60 | 66 | 61 | 76 | 66 | 90 | 68 | 78 | 65 | 18 | Heavy storm. 7 |
| | 24 | 89 | 62 | 59 | 62 | 59 | 72 | 67 | 88 | 65 | 70 | 64 | 20 | 22 |
| | 25 | 82 | 61 | 59 | 61 | 59 | 72 | 67 | 80 | 64 | 72 | 63 | 15 | None. |
| | 26 | 89 | 63 | 57 | 63 | 57 | 75 | 59 | 88 | 63 | 76 | 61 | 16 | .. |
| | 27 | 89 | 62 | 51 | 63 | 53 | 75 | 60 | 87 | 63 | 76 | 60 | 23 | .. |
| | 28 | 90 | 65 | 56 | 65 | 56 | 75 | 60 | 88 | 62 | 76 | 56 | 29 | .. |
| | 29 | 90 | 62 | 52 | 62 | 52 | 77 | 62 | 89 | 62 | 76 | 57 | 27 | None. |
| | 30 | 87 | 60 | 48 | 61 | 48 | 73 | 57 | 86 | 62 | 74 | 55 | 27 | None. |
| | 31 | 87 | 56 | 45 | 56 | 45 | 76 | 57 | 86 | 61 | 77 | 56 | 32 | .. |

## the Month of July 1859.

| Water Boils. | Mean between Sunrise and Sunset. Dry. | Wet. | Remarks. |
|---|---|---|---|
| | | | 1 Sky clear. 11 A.M. Strong breeze from W. 2 P.M. Strong breeze from W. till 5 P.M. Night cold. |
| | | | 2 Sky clear. 2 P.M. A gentle breeze fr. N.W.; cumuli to E.S.E. Night cold. |
| | | | 3 Sky clear. 9 A.M. Slight breeze from W. 2 P.M. Slight breeze from W. |
| | | | 4 Sky clear. No breeze during the day, except a slight dust storm from South at noon. 8 A.M. Gentle breeze from East. |
| ° | ° | ° | |
| 202·6 | 76·75 | 54·00 | 5 Sky clear, at sunrise. Noon. Slight breeze from W.; cloudy. 7 P.M. Sky covered with cirri; atmosphere hazy and thick. |
| 5,514 feet | | | 6 Sunrise. Sky clear. 9 A.M. Breeze from W. Furious wind from N.W., with dust, which continued until 8 P.M. |
| .. | .. | .. | 7 Sunrise. Sky clear. Air feels much cooler then yesterday. 9 A.M. Wind from W.; several dust columns; strong wind till sunset; sky clear. |
| 202·2 | .. | .. | 8 Sunrise. Sky clear. 9 A.M. Wind from S.W. Noon. Strong wind from W., with dust; several dust columns; sky clear. |
| 5,700 feet | | | 9 Sunrise. Sky clear. 9 A.M. No breeze; great number of dust columns. Noon. Slight breeze from S.; cumuli to the N. 4 P.M. Strong wind from North till 10 P.M. |
| .. | 84·75 | 66·25 | |
| .. | 83·25 | 63 25 | 10 Sunrise. Sky clear. Noon. Breeze from N. 3 P.M. No breeze. 4 P.M. Strong breeze from East. 7 P.M. Cu·ruli strata to S.W. |
| .. | 83·35 | 57·25 | 11 Sunrise. Sky clear. 9 A.M. Slight breeze from W. 2 P.M. Strong wind from E.; nimbi to E. and W.; distant thunder, followed by dust storm: 7 P.M. Breeze again from W. 9 P.M. Sky clear and bright. |
| .. | .. | .. | 12 Sunrise. Sky clear. 11 A.M. Strong breeze from W. 2 P.M. Cumuli; several dust columns. 7 P.M. Sky clear. |
| .. | .. | .. | 13 Sunrise. Sky clear. 11 A.M. Strong breeze from W.; until 5 P.M. occasional. 7 P.M. Sky clear. |
| 201·9 | .. | .. | 14 Sunrise. Sky clear. 1 P.M. No breeze from S. W. until 5 P.M., when it became strong until 7 P.M. |
| 5·900ft | | | |
| .. | 81·50 | 63·25 | 15 Sunrise. Sky clear. 9 A.M. Breeze from W. Noon. Strong breeze from W. E.; occasionally furious gusts of wind, with dust, till evening. |
| .. | 84·25 | 64·50 | 16 Sunrise. Sky clear. Noon. Breeze until evening. 6 P.M. Cirri to the east. |
| | | | 17 Sunrise. Sky clear. Noon. Breeze from N. 7 P.M. Cumuli to Eastward. |
| 200·8 | .. | .. | 18 Sunrise. Sky clear. Noon. Sky covered with cumuli, slight breeze from North. 7 P.M. Cirri and cirro cumuli. |
| 6,600 feet | | | 19 Sunrise. Strata to eastward. Noon. Many light clouds to E.; no breeze. |
| .. | 80·75 | 59·50 | 2 P.M. Breeze from W. 7 P.M. No breeze; sky covered with cirro cumuli. |
| .. | 81·75 | 59·25 | 20 Sunrise. Sky clear. 9 A.M. Breeze from W.; a few detached cumuli during the day. 7 P.M. Dark strata nimbi and cumuli up from east. |
| .. | 83·00 | 62 00 | 21 Sunrise. Sky clear. 9 A.M. Gentle breeze from W. Noon. Strong breeze from |
| .. | 81·50 | 64·75 | E.; dark columns strata; distant thunder. 7 P.M. Sky clear; no breeze. |
| | | | 22 Sunrise. Sky covered with strata, and detached. 9 P.M. Sky clear; breeze from N. E. 1 P.M. Cumuli strata and nimbi W. and East; distant slight rain. 7 P.M. Sky cloudy. |
| .. | .. | .. | |
| 200·0 | 80·25 | 65·50 | 23 Sunrise. ditto. 9 A. M. Ditto. Noon. Sky almost clear; breeze from East. 8 A.M. Heavy thunder storm with cumuli strata and nimbi. |
| 7,068 feet | | | 24 Sunrise. Sky clear. 1 P.M. Sky covd. with clouds 4 P.M. Cum. strata nimbi; dist. thunder. 5 P.M. Heavy thunder and rain; wind E. 7 P.M. Cloudy to S. |
| .. | 80·25 | 64·00 | 25 Sunrise. Sky clear; strata to the Eastward. Noon. Sky covered with clouds; |
| .. | 77·50 | 58 75 | cumuli strata nimbi; breeze East. 7 P.M. Dark heavy clouds; misty up- |
| .. | 76·25 | 63·00 | pearance on the hills; wind in gusts. |
| .. | 76·25 | 63 00 | 26 Sunrise. Sky cloudy. 9 A.M. ditto. Noon. Sky clear breeze West. Sunset Sky misty; strata to West. 5 P.M. Strong breeze from W. and S. W. |
| | | | 27 Sunrise. Sky clear. 9 A.M. Ditto. Noon. Gentle breeze from W.; sky clear. 8 P.M. Dist. thunder. 7 P.M. Nimbi to E.W. 8 P.M. Dist. lightning. |
| | | | 28 Sunrise. Sky clear. Gentle brz. fr. S.W. during the day. 7 P.M. Lt. cum. |
| .. | 77·50 | 65·00 | 29 Sunrise. Sky clear. Sky entirely covered by clouds; heavy dew last night. 3 P.M. Breeze from S. W. 7 P.M. Sky covered, cumulo strata; dark and heavy to eastward; several dust columns with dry distant thunder. |
| .. | 73·00 | 63·75 | 30 Sunrise. Sky cloudy. 9 A.M. Cumuli. Noon. Breeze from S. W. 4 P.M |
| .. | 71·25 | 63 25 | Breeze from W. N. W. 7 P.M. Cirri to eastward. |
| .. | 75·50 | 60·00 | 31 Sunrise. A few strata. 10 P.M. Breeze from W. Noon. Breeze from S. W. 1 P.M. Cumulo strata to east; breeze from S. S. W. |
| .. | 75·25 | 59·00 | |
| .. | 78·50 | 58·50 | |
| .. | 78·50 | 58·25 | |
| .. | 73·50 | 56·25 | |
| .. | 73·75 | 54·75 | |

| | Dry bulb. | Wet bulb. | Difference. |
|---|---|---|---|
| Mean maximum during the month.... | 94·70 | .... | 8·75 |
| Mean minimum ..... | 63·43 | 59·43 | 8·75 |
| Mean of a day bet. sunrise and sunset | 34·91 | 60·83 | 14·80 |
| Extreme maximum ..... | 105· | .... | 56· |
| Extreme minimum ..... | 42· | | |

Days on which rain fell 3; quantity 42 cents; prevailing winds Westerly; mean daily evaporation in cents 28·25.

## Meteorological Register for

| Station. | Date. | Maximum. | Night. | | Sunrise. | | 9 A.M. | | 1½ P.M. | | Sunset. | | Evaporation. | Rain. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | Dry. | Wet. | | |
| | Aug. | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° |
| Khelat. | 1 | 83 | 55 | 45 | 55 | 45 | 74 | 57 | 81 | 62 | 74 | 55 | ·31 | None. |
| | 2 | 85 | 54 | 43 | 54 | 43 | 74 | 55 | 84 | 59 | 71 | 52 | ·33 | .... |
| | 3 | 88 | 53 | 44 | 53 | 44 | 76 | 56 | 87 | 61 | 70 | 52 | ·30 | .... |
| | 4 | 90 | 54 | 41 | 54 | 41 | 77 | 52 | 89 | 61 | 75 | 55 | ·32 | .... |
| | 5 | 88 | 54 | 43 | 55 | 43 | 78 | 58 | 86 | 62 | 72 | 54 | ·34 | .... |
| | 6 | 86 | 53 | 43 | 53 | 43 | 75 | 57 | 85 | 61 | 72 | 53 | ·35 | .... |
| | 7 | 89 | 56 | 44 | 56 | 44 | 77 | 57 | 88 | 62 | 74 | 55 | ·36 | .... |
| | 8 | 87 | 55 | 44 | 55 | 44 | 75 | 58 | 86 | 63 | 74 | 56 | ·34 | None. |
| | 9 | 90 | 53 | 44 | 53 | 44 | 75 | 59 | 88 | 64 | 71 | 54 | ·33 | .... |
| | 10 | 86 | 53 | 43 | 53 | 43 | 76 | 60 | 85 | 61 | 72 | 53 | ·30 | .... |
| | 11 | 87 | 51 | 40 | 51 | 40 | 76 | 57 | 85 | 62 | 71 | 52 | ·31 | .... |
| | 12 | 89 | 53 | 41 | 53 | 41 | 74 | 54 | 87 | 61 | 70 | 53 | ·31 | .... |
| | 13 | 89 | 56 | 51 | 56 | 51 | 73 | 58 | 87 | 63 | 71 | 53 | ·28 | .... |
| | 14 | 89 | 55 | 50 | 55 | 50 | 75 | 60 | 88 | 63 | 75 | 61 | ·28 | .... |
| | 15 | 91 | 55 | 48 | 55 | 48 | 78 | 60 | 90 | 64 | 78 | 60 | ·25 | None. |
| | 16 | 92 | 56 | 48 | 56 | 48 | 80 | 62 | 90 | 65 | 77 | 57 | ·30 | .... |
| | 17 | 90 | 55 | 44 | 55 | 44 | 80 | 59 | 89 | 64 | 77 | 55 | ·34 | .... |
| | 18 | 95 | 55 | 43 | 55 | 44 | 79 | 59 | 93 | 65 | 76 | 58 | ·33 | .... |
| | 19 | 92 | 58 | 47 | 58 | 49 | 79 | 61 | 90 | 65 | 79 | 60 | ·34 | Shower at 5 P.M. |
| | 20 | 90 | 60 | 53 | 60 | 53 | 79 | 63 | 89 | 66 | 77 | 62 | ·31 | A few drops only. |
| | 21 | 85 | 60 | 56 | 60 | 56 | 76 | 61 | 84 | 64 | 67 | 61 | ·29 | 2 P.M., Heavy showers, 10 cents. |
| | 22 | 88 | 58 | 55 | 59 | 56 | 73 | 60 | 86 | 69 | 72 | 64 | ·18 | A few drops only. |
| | 23 | 84 | 58 | 52 | 59 | 53 | 75 | 63 | 83 | 65 | 74 | 62 | ·19 | Heavy showers, 9 cents. |
| | 24 | 83 | 55 | 51 | 55 | 51 | 75 | 59 | 82 | 60 | 72 | 53 | ·20 | None. |
| | 25 | 88 | 48 | 40 | 48 | 40 | 74 | 57 | 87 | 64 | 71 | 53 | ·37 | .... |
| | 26 | 89 | 46 | 38 | 48 | 40 | 75 | 59 | 87 | 65 | 72 | 54 | ·28 | .... |
| | 27 | 89 | 54 | 43 | 54 | 43 | 74 | 61 | 87 | 65 | 72 | 54 | ·29 | .... |
| | 28 | 90 | 52 | 41 | 52 | 41 | 75 | 57 | 88 | 63 | 69 | 52 | ·28 | .... |
| | 29 | 88 | 47 | 37 | 48 | 38 | 75 | 57 | 86 | 61 | 71 | 53 | ·34 | .... |
| | 30 | 87 | 47 | 37 | 49 | 38 | 73 | 55 | 85 | 57 | 71 | 52 | ·33 | .... |
| | 31 | 90 | 48 | 37 | 50 | 39 | 74 | 55 | 88 | 62 | 76 | 52 | ·36 | .... |

the Month of August 1859.

| Water Boils. | Mean between Sunrise and Sunset. Dry. | Wet. | Remarks. |
|---|---|---|---|
| | | | 1 Sunrise. Sky clear; slight br. fr. S. 9 A.M. Br. slight. 11 A.M. Strong br. fr. W. until 4 P.M. Sunset. Sky cloudy; cu.s. 9 P.M. Steady wind from S. W. |
| | | | 2 Sunrise. Sky clear; breeze from S. 11 A.M. Breeze from W. Noon. Strong breeze from W. with occasional dust. Sunset. Sky clear. |
| ° | ° | ° | 3 Sunrise. Sky clear. 9 A.M. Slight breeze from W. Noon. Breeze from W. with occasional gusts. 7 P.M. Breeze from N. W. Night cold. |
| | | | 4 Sunrise. Sky clear; breeze from South. 11 A.M. Breeze West. Noon. Many cumuli; breeze N.W. 7 P.M. No breeze; sky covered with clouds. |
| 200 | 71·00 | 54·75 | 5 Sunrise. Sky clear; breeze South. Noon. No breeze. 4 P.M. Breeze |
| 7,080ft | | | from W. 7 P.M. Sky clear; no breeze. |
| .. | 70·75 | 52·25 | 6 Sunrise. Sky clear. 10 A.M. Strg. breeze fr. W. 7 P.M. Sky clear; no breeze. |
| .. | 71·50 | 53·25 | 7 Sunrise. Light cirri; breeze S. W. 9 A.M. No breeze. 4 P.M. Breeze W. |
| .. | 73·75 | 52·25 | 8 Sunrise. Sky clear; breeze South. 11 A.M. Breeze N. W. Noon. Ditto. 4 P.M. Strong breeze from W. 7 P.M. Breeze from N.; hills misty. |
| .. | 72·75 | 54·25 | 9 Sunrise. Sky clear. 9 A.M. Light breeze from W. Noon. Strong wind from W. 7 P.M. Sky clear; light breeze West. |
| .. | 71·55 | 53·05 | 10 Sunrise. Sky clear. Noon. Little or no breeze. 2 P.M. Breeze from West. |
| .. | 71·75 | 55·25 | 4 P.M. Strong wind West. 7 P.M. Breeze S.; Sky clear; light cumuli to W. |
| .. | 72 50 | 55·25 | 11 Sunr. Sky clr.; br. S. 9 A.M. Br. W.S.W. Noon. Br. fr. W. 7 P.M. Sky clr.; lt. br. |
| | | | 12 Sunr. Sky clr.; br. S. 9 A.M. Br. W. Noon. Lt. br. fr. W. 7 P.M. A few cu. to E. |
| | | | 13 Sunrise. Sky clear; br. S 11 A.M. Br. W. till 6 P.M. with occasional gusts and dust squalls. 7 P.M. Cu. and cu.s. with dist. thunder and lightning. |
| .. | 71·75 | 55·25 | 14 Sunr. Sky clear; br. from E. 7 P.M. Br. S. E.; heavy clouds S. W.; cu.s., &c. |
| .. | 71·75 | 54·25 | 15 Sunrise. Sky clear. 9 A.M. No breeze. Noon. Breeze from East. 7 P.M. |
| .. | 70·75 | 55·25 | No breeze; heavy clouds to E. S.; many dust columns during the day. |
| . | 71·00 | 52·25 | 16 Sunrise. Sky clear; breeze S. 9 A.M. No breeze. Noon. Very light breeze from East. 7 P.M. ditto from N. W.; a few strata to S. |
| .. | 71 75 | 56 25 | 17 Sunr. Sky clear; br. fr. E. 9 A.M. None. 11 A.M. Br. W. until 7 P.M.; sky clear. |
| .. | 73·25 | 58·50 | 18 Sunrise. Sky clear; breeze from S. 9 A.M. None. Noon. Light breeze from |
| 200 | 75 21 | 58·00 | east. 3 P.M. Breeze from W.; sky clear. 7 P.M. A few detached cumuli to W.; no breeze. 5 P.M. Dust columns from W. 10 minutes. |
| 700 ft | | | 19 Sunrise. Sky clear; breeze W. 2 P.M. Dust columns. 3 P.M. Cumuli and |
| .. | 75·75 | 58·00 | cirri strata with nimbi. 5 P.M. Sky overcast; shower. 7 P.M. Do.; heavy dust storm from N. lasting half an hour. |
| .. | 75·25 | 55·50 | 20 Sunrise. Sky clear; breeze soft and cool South. 11 A.M. Breeze East; cirri |
| .. | 77 75 | 56·50 | and cirro cumuli to East. Noon. Sky covered with cirro cumuli. 4 P.M. Do.; with nimbi; slight shower. 7 P.M. Light breeze W; cloudy. |
| .. | 76·50 | 58 75 | 21 Sunrise. Sky clear. 11 A.M. Br. from W. Noon. Br. E.; cu.s. and n. coming up from E. 2 P.M. Covered; rain. 3 P.M. Br. W. 7 P.M. S. and n. |
| | | | 22 Sunrise. Cirri and cirro cumuli; breeze S. 9 A.M. Sky clear. Noon. Cirri |
| .. | 76·25 | 61·00 | and cumuli; gentle breeze from W. 4 P.M. Cumuli strata and nimbi to E. S. and N.; distant thunder and slight rain. 7 P.M. Cirri strata to W. |
| | | | 23 Sunrise. Sky covered with c. cu.; br. S. 9 A.M. Sky clear. Noon. c.cu. 2 P.M. Dark cu. s. and n.; gusts of wind from W. with distant thunder, followed |
| .. | 71·75 | 61·75 | by heavy shower of rain. 7 P.M. No br.; c. and s. to W. |
| | | | 24 Sunrise. Sky clear; breeze S. 10 A.M. Strong breeze N.W.; cirri. 1 P.M. Strong wind from N. W. 7 P.M. Strong breeze from N.W.; atmosphere thick and hazy, apparently from fine dust. |
| | | | 25 Sunrise. Sky clear; breeze South. 9 A.M. Sky clear; cool breeze from |
| .. | 72·50 | 62·25 | N.W. 2 P.M. Little or no breeze; sky clear. 7 P.M. Cool breeze from W. 26 Sunrise. Sky clear; breeze S; cold. 9 A.M. Light N.E. breeze. 2 P.M. Cumuli to E. 4 P.M. Strong wind from W. 7 P.M. Light breeze; a few cirri. |
| | | | 27 Sunrise. Strata to Eastward; no breeze. 2 P.M. Gentle from West; a few clouds to Eastward. 7 P.M. Strata to East and South; light W. breeze. |
| .. | 73·00 | 61·75 | 28 Sunrise. Sky clear; br. S. 9 A.M. Light easterly br. 2 P.M. Sky clear; br. W. N. W. 7 P.M. Sky clear, with the exception of c. s. to E. W.; light W. br. |
| | | | 29 Sunrise. Sky clear; lt. S. br. 9 A.M do.; no br. 10 A.M. Gentle W. br. 2 P.M. A few cu. to E.; br. W. 7 P.M. do.; breeze W.N.W. Night cold. |
| .. | 71·00 | 55·75 | 30 Sunrise. Sky clear; breeze South. 10 P.M. Breeze Westerly. 2 P.M. |
| .. | 70·00 | 53 05 | breeze W.; sky clear. Sunset. A light westerly breeze; sky clear. Night cold. |
| .. | 70·50 | 54·50 | 31 Sunrise. Sky clear; breeze S. 9 A.M. Breeze W. 2 P.M. Little or no breeze; cumuli cirri to E. 7 P.M. Cirro cumuli and cirri strata; light W. breeze. |

| | Dry bulb. | Wet bulb. | Difference. |
|---|---|---|---|
| Mean maximum during the month.. | 88·29 | .. | .. |
| Mean minimum ..... | 53·87 | 44·70 | 9·17 |
| Mean between sunrise and sunset.... | 72·93 | 55·16 | 10 87 |
| Extreme maximum ..... | 96· | .. | 49·0 |
| Extreme minimum ..... | 46· | | |
| Mean daily evaporation in cents .... | 30· | | |

Days on which rain, fell 5; quantity, 20 cents; prevailing wind, West.

# AN ACCOUNT OF THE CALCULI CONTAINED IN THE MUSEUM OF THE GRANT MEDICAL COLLEGE, BOMBAY,

## WITH SOME GENERAL REMARKS ON CALCULI IN INDIA.

BY H. V. CARTER, M.D., Lond., Acting Assistant Surgeon J. J. Hospital, and Acting Curator of the Museum.

Presented August 1859.

When I had the honour of being appointed Curator of the Grant Medical College Museum, there was a collection of urinary calculi, numbering upwards of a hundred, and forming a tolerably complete series. As few of them had been chemically examined, or even divided, so as to show their real structure, I took advantage of the first vacation after my appointment, to catalogue and arrange the specimens. Not the least difficult part of the undertaking was that of obtaining the histories of such specimens as had references attached to them. These were mostly from the Jamsetjee Jejeebhoy Hospital, and in many cases it was possible to refer to cases contained in the Clinical Surgical Records, where an ample account is given. In other instances this was found impossible, chiefly because the calculi removed by operation are too briefly described to allow of satisfactory references being made. The loss thus entailed might be easily remedied—a brief statement of the external appearance, possible chemical composition, size, and weight of the specimen at the time of operation, would be sufficient.

Some of the general conclusions on the subject of calculi in the Bombay Presidency, have been based on the histories of cases contained in the Clinical Surgical Records. The cases occurring in the intervals between sessions, are, however, in many instances

wanting, and all those of the session 1852-53 I have not been able to find.

In this account of the College collection, I intend not merely to classify the specimens, but also to make some comparison between India (Bombay being the example) and England, in respect to frequency of certain species of calculus, weight, &c. of specimens, ages of patients, &c.

Disease generally, in the British dependencies, admits, I suppose, of the two methods of investigation—the abstract, and the comparative, with respect to England; and it not unfrequently happens that the comparative view leads to interesting results. Its general tendency, no doubt, is to assimilate the diseases of the two countries compared, but often to indicate striking differences. I need hardly do more than refer to the subjects of Bright's disease and tetanus, investigated by Professors of this College, in illustration of my meaning.

Calculi are naturally arranged according to their origin, whether human or from the lower animals. They are again subdivided by their nature, whether urinary, biliary, or intestinal, &c.

In the College collection are 3 specimens from the lower animals, 2 probably urinary and 1 intestinal. The two former are composed of carbonate of lime; their source unknown. There are 119 illustrative specimens of urinary calculi from man,* but the absolute number is considerably above this. There are only 3 biliary calculi; one of these is composed of cholesterine, the other two of inspissated bile. Considering the frequency of hepatic derangements in this country, the small number of biliary calculi collected appears striking.

The sources of the urinary calculi are as follows:—

50—60 From the Jamsetjee Jejeebhoy Hospital, including two or three from the dissecting rooms and *post mortem* house.

26 Presented by the late Assistant Surgeon Bowie.

9 Presented by Surgeon Ritchie.

* Several have been since added to the collection. See Appendix I.

24 From various sources; the principal donors being Drs. Barrington, Burn, Morehead, Mackenzie, DeCrespigny, Impey, Manisty, Broughton, Joseph, Mr. Lisboa, and Apothecary Anding.

Thus it will be seen that one-half the total number of specimens comes from the Jamsetjee Jejeebhoy Hospital, being, I suppose, nearly every one extracted by the surgeons during a period of upwards of 11 years. If the existing histories of cases could, in every instance, be adapted to the corresponding specimens, this series would be about as complete as possible.

*Classification.* Undoubtedly the best method of classification is that according to the character of the nucleus. From mere inspection of the exterior of a calculus, we learn as little of its nature, in many cases, as could be learnt of the nature of a disease by seeing it only in its latest stage. The earthy phosphates as invariably follow previous deposits, after a certain period, as disintegration of an organ succeeds to previous disease of that organ. In the Indian Annals of Medical Science, vol. 11, p. 64, is to be found an account of 186 calculi; and judging by the exterior alone, 36·6 per cent. appear to be phosphatic. But the real fact is, that calculi composed of phosphates alone, or having them as a nucleus, are very uncommon, only 4 specimens, less than 4 per cent., existing in the Grant College collection, and it is pretty much the same with European collections.

It is a fair presumption, that if the conditions which lead to the formation of certain nuclei had been absent, those nuclei, and the consequent calculi, would not have been formed. Hence the importance of ascertaining the relative frequency of nuclei, and the constitutional circumstances attending their formation, with reference to preventive treatment.

The catalogue of the Royal College of Surgeons, London, is perhaps as complete as any extant, and it has been taken as the pattern of the catalogue of the Grant College collection: the chief divisions, or genera, are arranged according to the character of the nucleus, and the species follow in regular order, being indicated by small letters, the genera by capitals. I have added the weight of each specimen in the description.

In the process of analysis, the plan recommended in Bowman's Medical Chemistry, was followed, and repeated examinations made, in some cases, to ascertain the true composition of the deposit. Those calculi which had been previously analysed (about 30 in number) have been re-examined, and about 90 new analyses were made. Every specimen is now divided, and the surface polished, in order to display the structure and nucleus.

It is to be observed that no ingredients of calculi are quite pure, the preponderating one giving the character. Something is thus left to the judgment to decide, and a few possible discrepancies might so arise. The accompanying table of contents is copied from that in the Catalogue of Calculi, Grant Medical College.

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CALCULI arranged according to NUCLEI, and the composition of the succeeding layers given after a regular plan.

### Series I.—Uric Acid—Nucleus.

| | | Present Number. |
|---|---|---|
| **A** | URIC ACID | 4 |
| **Aa** | Uric Acid. Urate of Ammonia | 6 |
| **Ab** | ditto Oxalate of Lime | .. |
| **Ac** | ditto Earthy Phosphates | 2 |
| **Ad** | Uric Acid. Urate Ammonia. Uric Acid | 1 |
| **Ae** | ditto ditto Oxalate of Lime | .. |
| **Af** | ditto ditto Earthy Phosphates | .. |
| **Ag** | Uric Acid. Oxalate of Lime. Uric Acid | .. |
| **Ah** | ditto ditto Urate of Ammonia | .. |
| **Ai** | ditto ditto Earthy Phosphates | 1 |
| **Ak** | Uric Acid, succeeded by 4 or more layers | .. |

### Series II.—Urate of Ammonia—Nucleus.

| | | |
|---|---|---|
| **B** | URATE OF AMMONIA | 6 |
| **Ba** | Urate of Ammonia. Uric Acid | 2 |
| **Bb** | ditto ditto Oxalate of Lime | 19 |
| **Bc** | ditto ditto Earthy Phosphates | 9 |

| | | | | |
|---|---|---|---|---|
| **B d** | Urate of Ammonia. | Uric Acid. | Urate of Ammonia. | 1 |
| **B e** | ditto | ditto | Oxalate of Lime.. | 1 |
| **B f** | ditto | ditto | Earthy Phosphates. | 1 |
| **B g** | Urate of Ammonia. | Oxalate of Lime. | Uric Acid.. | 3 |
| **B h** | ditto | ditto | Urate of Ammonia. | 2 |
| **B i** | ditto | ditto | Earthy Phosphates. | 8 |
| **B k** | Urate of Ammonia, succeeded by 4 or more layers.. | | | 1 |

### Series III.—Oxalate of Lime—Nucleus.

| | | | | |
|---|---|---|---|---|
| **C** | Oxalate of Lime ..... | | | 16 |
| **C a** | Oxalate of Lime. | Uric Acid..... | | 4 |
| **C b** | ditto | Urate of Ammonia ..... | | 2 |
| **C e** | ditto | Earthy Phosphates ..... | | 10 |
| **C d** | Oxalate of Lime. | Uric Acid. | Urate of Ammonia . | .. |
| **C e** | ditto | ditto | Oxalate of Lime.... | .. |
| **C f** | ditto | ditto | Earthy Phosphates.. | 1 |
| **C g** | Oxalate of Lime. | Urate of Ammonia. | Uric Acid.. | 3 |
| **C h** | ditto | ditto | Oxalate of Lime .. | 1 |
| **C i** | ditto | ditto | Earthy Phosphates. | 3 |
| **C k** | Oxalate of Lime, succeeded by 4 or more layers..... | | | 1 |
| **C $c^2$** | Oxalate of Lime. Phosphate of Lime. Oxalate of Lime | | | 4 |

### Series IV. to X.

| | | |
|---|---|---|
| **D** | Cystic Oxide..... | 1 |
| **E** | Triple Phosphate ..... | 1 |
| **F** | Fusible Calculus ..... | 1 |
| **G** | Phosphate of Lime..... | 2 |
| **H** | Animal Matter—Nucleus ..... | 1 |
| **I** | Calculi from Lower Animals..... | 3 |
| **K** | Biliary Calculi..... | 3 |

I now proceed to detail the results of analysis :—

*Per-centage of Calculi in India and in England, having for their Nucleus (A) Uric Acid, (B) Urate of Ammonia, (C) Oxalate of Lime (E) Earthy Phosphates, or composed of (D) Cystic Oxide.*

| | Grant Medical College. | | College of Surgeons, London. | Guy's Hospital. | Norwich Hospital. |
|---|---|---|---|---|---|
| | No. | Per cent. | Per cent. | Per cent. | Per cent. |
| Series A . | 14 | 11·76 | 43·16 | 52·40 | 48·87 |
| ,, B . . | 53 | 44·54 | 31·21 | 9·14 | 38·61 |
| | | 56·30 | | 71·79 | |
| ,, C . . | 46 | 38·65 | 14·75 | 22·59 | 13·27 |
| ,, D . . | 1 | ·84 | ·46 | 5·28 | None |
| ,, E . | 4 | 3·36 | 10·40 | 10·57 | 7·24 |

This Table shows—

1. The small proportion of Nuclei containing Uric Acid in India.
2. The large proportion of Nuclei containing Oxalate of Lime ditto.
3. The small proportion of Phosphatic Calculi. . . . . ditto.

In this Table it appears that calculi, the nucleus of which is composed chiefly or entirely of uric acid, or urate of ammonia, are proportionately much less frequent in India than in England. Thus they form 56·30 per cent. in India, in England 71·79 per cent.

On the other hand, calculi with oxalate of lime for their nucleus are much more frequent in India than in England : viz., 38·65 per cent. in India, 16·87 per cent. in England.

This fact is exceedingly interesting, and I am not aware that there is any fallacy involved in its statement. A simple way of putting it is as follows :—if a mulberry stone, or one with oxalate of lime for its nucleus, had not been formed and detained in the bladder; 3 persons out of nearly 18 in England, who suffer from calculus, would not have been troubled with that affection. In India, we may say that 3 persons out of 8 would not have been so affected. In other words, oxalate of lime forms the nucleus, or the entire body of a calculus, about twice as frequently in India as it does in England.

It is to be observed, however, that different districts in England give different results. Thus, oxalate of lime calculi are

more common in London than in the Provinces generally; but in one provincial town at least, there is an exception to this, for in Bristol, it appears that upwards of 40 per cent. of oxalate of lime calculi are found in the collection at the Bristol Infirmary, and this proportion is somewhat above the Indian average.

As I have had no opportunity of going into the details of this instance, and as Dr. Prout interprets the case differently, making the proportion a little less than in India, I need not say more of what is certainly an exceptional instance, and not annulling the general conclusion given above. In India, indeed, some difference is found: from the facts at command, it would seem that, in this Presidency, oxalate of lime calculi are more frequent than in the Punjaub, for instance; this is shown by the analysis of Drs. Ritchie's and Bowie's cases. Of course, it is possible the Bengal and Madras Presidencies might be found to agree rather with the Punjaub than with Bombay in this particular. The fact still remains that, in the latter, the result is as I have stated.

Taking again the college collection, we find that uric acid in one form or other, forms the nucleus of calculi in such proportion, that in India, 3 persons out of $5\frac{1}{5}$ would have no calculus, if uric acid did not exist; in England, it would be said 3 out of $4\frac{1}{4}$ would be thus circumstanced.

Calculi having earthy phosphates for their nucleus, or entire substance, are much less frequent here than in England, where they occur twice or thrice as often. This is mostly owing to the comparative rarity in this country of mixed phosphate or the fusible calculus; while, on the other hand, phosphate of lime is the common variety here (not prostatic).*

Some of the conclusions now stated are further illustrated by taking a somewhat different view of the subject. Thus, on comparing the proportionate number of calculi formed *wholly* of uric acid, urate of ammonia, and oxalate of lime, the striking preponderance of the latter, in this country, is as strongly indicated as in the first table.

* Here again it might be noticed that urate of ammonia being commonly found mixed with the fusible calculus, it is possible others would have given a different position to some of the specimens in the series B, transferring them to series F, but I have borne this circumstance in mind when arranging the specimens.

*Per-centage of Calculi in India and in England, entirely composed of (A) Uric Acid, (B) Urate of Ammonia, and (C) Oxalate of Lime.*

| | Grant Medical College. | | College of Surgeons, London. | Guy's Hospital. | Norwich Hospital. |
|---|---|---|---|---|---|
| | No. | Per cent. | Per cent. | Per cent. | Per cent. |
| Series A . | 4 | ..... 3·3 | 32·92 | 15·38 | 24·73 |
| ,, B . | 6 | ..... 5·0 | 2·15 | 3·84 | 8·29 |
| ,, C . | 17 | ..... 14·0 | 5·12 | 9·13 | 3·16 |

This table is sufficiently striking, and speaks for itself. It is seen that the collection at Guy's Hospital is that to which the Grant College collection most nearly approaches; but the difference is most marked, the proportion of oxalate of lime calculi being nearly double still. The series B exceeds A in our collection: in every other collection it is the reverse; but the distinction between the two is not always easy. In Dr. Marcet's time lithate of ammonia was not admitted at all. I have usually taken as sufficient evidence of its existence, a marked change of colour in litmus from red to blue (passing off on drying), on treating a small quantity of the powdered calculus with liquor potassæ in a test-tube.

The conclusions we are warranted in drawing from the facts now mentioned may be thus summed up:—1. That, in the Bombay Presidency, the proportion of calculi having oxalate of lime for their nucleus, or wholly composed of it, is about twice as great as in England, taking for comparison certain standard collections there. 2. That the proportion of calculi having uric acid, or a urate for their nucleus or entire substance, is considerably less in India than in England; in the former, urate of ammonia calculi are somewhat more frequent than uric acid calculi: the opposite is the case in England. 3. That the number of calculi wholly composed of earthy phosphates, or having them for a nucleus, is proportionately much fewer in India than in England: the difference being chiefly owing to the rarity of mixed phosphates in the former.

In an elaborate and interesting address made by Dr. Morehead to the Grant College Medical Society in the year 1857, data are given which appear to lead to conclusions different to those now stated, but Dr. Morehead says, "the question" (that

oxalate of lime calculi may be more common in India than in England) "cannot be received as settled, without more extended and more careful observation." This I have endeavoured to furnish through means of the collection at my disposal, and the results are at least definite and clear, if not universal for India, or absolutely correct.

Before proceeding to consider the influence of caste, locality, mortality of operations, &c., as compared with England, I wish to call attention to some interesting results of the analysis of calculi which, although well known to physicians at home, and found to obtain here, have yet become still more important since some recent investigations on urinary deposits were made. In no work that I have seen has the application of these last been made to the pathology of urinary calculi.

It appears to be a demonstrated fact that uric acid or urate of ammonia, may, by decomposition, furnish the elements of oxalic acid. Now the most common calculus of all those formed of more than one substance in the Grant College Collection, is that included under the head E b—a nucleus of urate of ammonia, an investment of oxalate of lime;—this variety forms 20 per cent. of all such compound calculi. In the Norwich Hospital collection, the same fact comes out, 16 per cent. of all compound calculi are thus formed. Dr. Prout also bears witness to the frequent sequence of the oxalate to the urate. The connection and intimate relation of the two, in this order, is undoubted. By way of contrast, the instances in which urate of ammonia *follows* oxalate of lime are very few indeed, not 2 per cent. in this collection, and less than 1 per cent. in that at Norwich. Dr. Prout's testimony here too accords, he calls the distinction between the two cases "very striking." These facts are inexplicable on the doctrines generally received, but admitting the possibility of the substitution of the organic acids of the urine, it becomes easy to imagine how, under certain circumstances, such, for instance, as a tropical climate, and a corresponding diet, one may take the place of the other.*

* I am unable to explain the circumstance that in the Museums of the Grant Medical College, Norwich Hospital, and Royal College of Surgeons in London, calculi are found in which uric acid *follows* oxalate of lime, and that not uncommonly; whereas uric acid *preceding* oxalate of lime is very uncommon, there being no instance of it in the first-named collection.

The ratio it will be seen is the reverse of what obtains with regard to urate of ammonia.

The above-mentioned results of analysis clearly show that there is a *tendency* to the succession of oxalate of lime to urate of ammonia in a large number of cases, and this tendency cannot be looked upon as accidental. There must, then, be an intimate relation between these substances; and I proceed to state some further facts and experiments which amply warrant this inference. Dr. O. Rees finds grounds for believing that oxalate of lime is in all cases formed after secretion of the urine, by some decomposition, or fermentative change, of uric acid or urates. It seems to be shown that deposits of oxalate of lime in the urine may at any time be *produced* by heating the common lateritious deposit of urates. It is stated that morning urine left to stand some hours, often contains oxalate of lime in quantity, when the fresh urine did not contain any trace of it (*Lehmann*). Urates when injected into the blood, produce oxalate of lime in the urine (*Wöhler and Frerich*). A Dublin physician (Dr. Aldridge) has proved that uric acid may be theoretically considered as representing the elements of oxalate and carbonate of ammonia, hydrocyanic acid and formic acid, if we add to its atoms merely the elements of water. He has demonstrated this, by heating urine, and in some cases, by evaporating it, he has succeeded in causing a deposit of oxalate of lime, while evidence of the presence of hydrocyanic and formic acids could be obtained from the fluid. This formula shows part of the re-arrangement of elements :—

| | C | N | H | O |
|---|---|---|---|---|
| 1 atom of uric acid ..... | 10 + | 4 + | 4 + | 6 |
| 10 atoms of water ..... | | | 10 + | 10 |
| | 10 + | 4 + | 14 + | 16 |
| 2 atoms of oxalate of ammonia .. | 4 + | 2 + | 6 + | 6 |
| 2 atoms of formate of ammonia .. | 4 + | 2 + | 8 + | 6 |
| 2 atoms of carbonic acid..... | 2 | | + | 4 |
| | 10 + | 4 + | 14 + | 16 |

It must then be admitted that uric acid, or a urate, readily decomposing, may be the source of oxalic acid in the urine: on the other hand, it is as clear that we cannot look for the opposite,

viz. the succession of urate to oxalate, nearly so frequently. The chemical analysis of urinary calculi confirms, in a forcible manner, these inferences. In Dr. Rees' Croonian Lectures on "Calculus Disease" for 1856, may be found other reasons, derived from comparisons of symptoms, and effects of treatment, for considering the prevalent doctrines on these subjects as erroneous. He endeavours, indeed, to show that there is but one true "diathesis," and that the uric acid. According to his view, the so-called oxalic acid "diathesis" has no foundation in nature: it is only a modification of the uric. As before stated, I am inclined to look upon the facts elicited by the analysis of the calculi in the Grant College collection as confirmatory, to some extent, of this view, since it affords the best explanation of these facts.

It has not yet been determined what the circumstances are, under the operation of which uric acid gives origin to oxalic acid in the body. Dr. Rees believes the latter to be formed *after* secretion of the urine, and considers that the detection of oxalate of lime in the *blood* to be the consequences of the analytic process employed for its detection. Outside the body, the production of one from the other may arise from mere exposure to the air,* or from heating the urine. When the physiological effects of residence in the tropics shall be defined, with any approach to precision and fullness, it may probably be found, that, as compared with European experience, oxalates are more frequent in the urine, as well as in calculi; and urates as much less frequent.

If it be allowable to make any inferences from the frequency of phospatic calculi in India, we might say that the mucous membrane of the bladder is less disposed to become irritated and inflamed, or, what is nearly the same thing, the urine in this country is generally of a less irritating quality, than in England.

Phosphate of lime is commonly associated with the oxalate. This appears to be more generally the case in India,— the phos-

* "It has long been known that the urate of ammonia contained in specimens of guano, frequently becomes entirely converted into oxalate of ammonia during the voyage home; so that there is but little difficulty in believing that oxalate of ammonia may thus form in human urine when urate of ammonia is in excess; and that, by decomposition of the calcareous salts present, oxalate of lime may form."—*Rees.*

phate following, or preceding the oxalate—than in England. I have been obliged to add, in this account, another species of calculus, **C c²** (O. L., P. L., O. L.) to the catalogue; of which there are 4 specimens, all much alike.

*Influence of locality.*—On arranging the facts at my disposal, I find that certain provinces of this Presidency furnish more cases of calculus than others: the Concan (including Bombay, Goa, and Surat), the largest number; then Sind, Guzerat, Cutch, the Deccan, and Kattiwar. Nine cases came from the Punjaub. A very large proportion of cases occurred in inhabitants of Bombay; perhaps the "hard" water many of them habitually drink may pre-dispose them to calculus. The saline springs of India are chiefly found in Sind, and higher portions of the Punjaub; their mineral contents, however, seem to be chiefly soda salts (*Macpherson*).

Dr. Peet was kind enough to draw my attention to a paper in the Edinburgh Medical Journal, vol. iii., by Dr. Playfair, of Bengal, which contains tables showing the frequency of calculi on that side of India. He states, that, during four years, only 11 cases of calculi occurred in the dispensaries of Bengal Proper; while no less than 828 occurred in the North-West Provinces. This remarkable difference Dr. Playfair attributes to the kind of food used, rice being the staple in Bengal and in Madras (where calculi are also infrequent), and a coarse flour (ottah) in the North-West Provinces.

The accompanying table must be taken at its real value only; but it expresses common experience, to some extent.

*Table showing the Place of Residence of Patients at the time of being affected with Calculus, expressed according to Provinces.*

| Source. | Punjaub. | Sind. | Cutch. | Guzerat. | Kattiwar. | Concan, &c. | Deccan. |
|---|---|---|---|---|---|---|---|
| Jamsetjee Jejeebhoy Hospital..... | 1 | 4 | .. | 3 | 3 | 34 | 4 |
| Bowie..... | .. | 11 | 9 | 6 | .. | .. | .. |
| Ritchie ..... | 8 | .. | .. | .. | .. | .. | .. |
| Various ..... | .. | .. | .. | 1 | .. | 1 | 1 |
| Total.. | 9 | 15 | 9 | 10 | 3 | 35 | 5 |

As regards Great Britain, it is said, by one author, that no fact is better established than that of the varying prevalence of calculi in different districts. Take, for instance, Norfolk and Paisley as contrasted with Hereford, where calculi are very rare. There is a similarity in this respect, then, between England and India.

*Influence of Caste.*—It may be asked, are all the inhabitants of Bombay (*e. g.*) equally subject to calculus? If a reply may be ventured, with the facts at command, it would appear that Parsees are far more liable to calculus disease than either Mussulmen or Hindoos; next Indo-Europeans; and lastly, the Mussulman is also more liable to calculus than the Hindoo, who, of all castes, is the least liable. In spite of many considerations which naturally suggest themselves, I am inclined to look upon this statement as approximately true. The distinction between the flesh-eaters, and solely vegetable-feeders is clear and interesting.

*Table showing the Proportion of the Chief Castes of Inhabitants in Bombay generally, In-Patients of Jamsetjee Jejeebhoy Hospital, and of cases of Calculus, Jamsetjee Jejeebhoy Hospital.*

| Admissions into Jamsetjee Jejeebhoy Hospital. | Cases of Calculus. Jamsetjee Jejeebhoy Hospital. | Population of Bombay. |
|---|---|---|
| Hindoos to Mussulmen, 1 to 1. | Hindoos to Musssulmen, $1\frac{2}{3}$ to 1. | HindoostoMussulmen 3 to 1. |
| Hindoos to Parsees, $4\frac{1}{2}$ to 1. | Hindoos to Parsees, $1\frac{1}{2}$ to 1. | Hindoos to Parsees, 13 to 1. |
| Hindoos to Indo-Europeans, $2\frac{1}{2}$ to 1. | Hindoos to Indo-Europeans, 6 to 1. | Hindoos to Indo-Europeans, 15 to 1. |

It would seem, too, from Dr. Playfair's tables, that Mussulmen are rather more inclined to calculus than Hindoos, in the North-West Provinces.

As to the influence of *caste* on the *chemical composition* of the calculus, Mr. Bransby Cooper (Guy's Hospital Report, v. 7, Second series) inferred that it was not great, or very marked, judging from 12 specimens sent to him by Dr. Coles, of Bengal. It might have been expected that, in accordance with the theories of the day, the vegetable-feeding Hindoo, and meat-eating

Mussulmen would hardly be affected with the same species of calculus. But the influence of diet, speaking generally, is not so distinct as anticipated.

*Distribution of Calculi amongst the principal Divisions of Inhabitants, principally patients of the Jamsetjee Jejeebhoy Hospital.*

Hindoos 24. Mussulmen 15. Parsees 12. Portuguese 4. Jews 2.

[*It is to be noticed that the proportion of Mussulmen appears to be greater in Bombay than in the country.*]

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*Distribution of the various species of Calculi amongst these great Division of Patients, from the Catalogue of the Grant Medical College Museum.*

| Hindoos, 27. | Mussulmen, 8. | Parsees, 7. | Indo-Europeans, 4. | Jews, 1. |
|---|---|---|---|---|
| Series A——B——C | Series A—B—C | Series A-B——C | Series A—B—C | Series B |
| A a B a C (2)<br>A c (2) B b (7) C A<br>B c (3) C c (2)<br>B e C e<br>B g (2) C g<br>B i C c 2<br>B k | A B c C (3)<br>A i C b<br>C c 2 | B Ca<br>B c (2) C g<br>B g (2) | A c B d C<br>C k | B c |

These forty-seven cases are the only ones in the manuscript catalogue, in which the caste of the patient and the chemical composition of the calculus are authentically ascertained.

In the table, I have arranged 47 cases; and, after some consideration, find myself unable to make any satisfactory deduction. If anything, the Hindoo is *less* liable to oxalate of lime calculi than any of the other castes or divisions. It is worth noting, however, that the series **B b**, which I have before referred to, appears to be more common in him, than in the rest; all the authenticated cases (7 in number) occurring amongst Hindoos. The experience here, as to the influence of diet, bears out the opinions of some eminent chemists in Europe (Liebig, Jones, Lehmann). Before proceeding to consider the results of lithotomy in Bombay, it may be interesting to compare the age of the patients, weight of the calculi, &c. with what is found in England.

*Age.*—As in England, the greater number of cases are found under the age of 20; viz. 55·4 per cent.; or, taking the Jamsetjee

Jejeebhoy Hospital alone, 60 per cent.; in England, the proportion is rather more, being 71 per cent.

On referring to the table, it will be found that, taking all cases, more instances of calculus occur here between 20 and 40, and between 40 and 60, than in England. After this age, the cases are fewer in proportion. Perhaps the explanation of this difference may be found in the fact that patients are not so early brought to the surgeon here, as in England.

*Ages of the Patients operated upon, from various sources.*

| Age. | No. of Cases. | Proportion per cent. | | |
|---|---|---|---|---|
| | | All Sources. | Jamsetjee Jejeebhoy Hospital only. | England. |
| 1 to 20 | 46 | 55·4 | 60·0 | 71·20 |
| 21 „ 40 | 22 | 26·5 | 18·0 | 12·10 |
| 41 „ 60 | 13 | 15·8 | 18·0 | 10·87 |
| 61 „ 80 | 2 | 2·4 | 4·0 | 5·72 |

In this Table it is seen that the experience of the Jamsetjee Jejeebhoy Hospital approaches nearest to that of Europe.

*Occupation of Patients affected with Calculus.*—The list from the Jamsetjee Jejeebhoy Hospital Records does not furnish any subject of comment. There were beggars 3, butlers 3, borah 1, clerks 2, cook 1, farmers 2, fuckeer 1, labourers 3, moonshee 1, pensioner (native) 1, ramosee 1, sawyer 1, shop-keeper 1, servants 2, tailor 1, tanner 1.

*Size and Weight of Calculi extracted.*—I find, taking 100 specimens from the Museum, that the weight of the calculi approximates very closely with what occurs in England, judging from the Norwich Hospital Collection; 73 per cent. are under, or not more than, 1 oz. in weight; 15 per cent. two ounces and under; 6 per cent. three ounces and under; 5 per cent. four and under; and 1 per cent. five ounces. It would seem that calculi above 3 oz. are rather more frequent in India than in England. In most of these cases the *present* weight is given, not that at the time of extraction; this is important to notice, since all calculi contain, while in the bladder, a considerable amount of moisture, and small calculi lose a fourth or upwards, of their weight, by being divided.

*Weight of* 100 *Calculi in Grant Medical College Museum.*

| Source. | 3i (60 gr.) | oz. ½ (240 gr.) | oz. 1 (480 gr.) | oz. 2 (960 gr.) | oz. 3 (1440 gr.) | oz. 4 (1920 gr.) | oz. 5 (2,400 gr.) |
|---|---|---|---|---|---|---|---|
| J. J. Hospital. | 13 | 16 | 10 | 4 | ... | 4 | 1 |
| Bowie ..... | 3 | 6 | 5 | 6 | 5 | 1 | ... |
| Ritchie ..... | 1 | 2 | 2 | 3 | 1 | ... | ... |
| Various ..... | 6 | 7 | 2 | 2 | ... | ... | ... |
| Total per cent. | 23 | 31 | 19 | 15 | 6 | 5 | 1 |
| | | 73 | | | | | |
| Norwich Hospital, per cent. | | 73 | | 16·5 | 5·0 | 1·56 | 0·7 |

*Mortality of Lithotomy and Causes of Deaths.*—The Statistics of the Jamsetjee Jejeebhoy Hospital furnish the principal data.

*Statistics of Calculus, Jamsetjee Jejeebhoy Hospital.*

| Year. | Hospital admissions. | Cases of Calculus, Urethral and Vesical. | Lithotomy; Number of Operations. | Deaths. | Cause of Death. |
|---|---|---|---|---|---|
| 1849-50 | 4242 | 4 | 3 | 1 | Dysentery consequent on operation, case being complicated with hæmorrhoids. |
| 1850-51 | 4846 | 6 | 4 | .. | |
| 1851-52 | 4126 | 7 | 6 | 1 | Peritonitis. |
| 1852-53 | 4162 | 6 | 3 | .. | |
| 1853-54 | 4514 | 8 | 2 | 1 | Diseased Kidneys and Bladder. |
| 1854-55 | 5560 | 5 | 3 | 1 | Exhaustion. |
| 1855-56 | 4067 | 10 | 10 | 1 | Dysentery; cystitis. |
| 1856-57 | 4876 | 5 | 5 | .. | |
| 1857-58 | 4813 | 7 | 7 | 1 | Exhaustion. |
| 1858-59 | 4303 | 6 | 5 | .. | |
| Total.. | 45,509 | 64 | 48 | 6 | |

| | | | |
|---|---|---|---|
| Mortality of Lithotomy, Jamsetjee Jejeebhoy Hospital. | 1 in 8 | Europe..... | 1 in 6-7 |
| Propor$^{n}$ of cases of stone to tot. cases. | 1 in 710 | Europe.. | 1 in 500 (about). |

The total number of cases of calculi (urethral and vesical) admitted in a period of a little over 10 years, amounts to 64. The number of operations for lithotomy is 48, and the deaths are 6. It should be observed, however, that there is considerable difficulty in ascertaining correct data, and it might be objected that one fatal case, at least, is hardly attributable to the operation, as death did not occur till 3 months afterwards. The mortality of lithotomy in the Jamsetjee Jejeebhoy Hospital, reckoned at 1 in 8, is stated at the least favourable rate, and yet contrasts favourably with what is found in Europe.

The late Assistant-Surgeon Bowie records only 2 deaths out of 26 operations. Surgeon Ritchie, in his cases, 1 death out of 7 operations. On the Bengal side, Dr. Playfair's personal experience was 1 fatal case in $8\frac{1}{3}$ operations, and his tables from the North-West Provinces chiefly, show a mortality of 1 in 9-10. Another operator, Dr. Simpson, at Tirhoot, was far more successful, having 1 death in 22 operations. The difficulty, if not impossibility, of obtaining a correct average, is not confined to India: in England, the mortality is variously reckoned as 1 in $4\frac{1}{2}$, and 1 in 8.*

It is an additional argument in favour of India, that cases are rarely selected, or undergo much preparatory treatment, in this country.

As to the *Causes of death*, the accompanying table includes, besides the fatal cases occurring in the Jamsetjee Jejeebhoy Hospital, three additional ones, and gives a brief summary of the more interesting particulars connected with the cases, as far as could be ascertained.

| Age. | Period of Death. | Cause of Death. | Remarks. | Weight. | Composition. |
|---|---|---|---|---|---|
| Yrs. 45 | 2 weeks.. | Kidneys diseased.. | No previous symptoms of stone till sounded, except lumbar pains (having been treated for lumbago and rheumatism) and stoppage of urine sometimes. | Grs. 750 | **A d** |

* A very recent summary of London cases, copied into Ranking's abstract, 1859, v. 1, shows that out of 186 operations were 40 deaths: the proportion being 1 in $4\frac{6}{10}$.

| Age. | Period of Death. | Cause of Death. | Remarks. | Weight. | Composition. |
|---|---|---|---|---|---|
| Yrs. | | | | Grs. | |
| 40 | 30 hours .. | Exhaustion..... | A difficult and prolonged operation; apparently not under influence of chloroform during operation. | 374 | **A i** |
| 40 | 6th day .. | Exhaustion..... | No difficulty in extraction; bleeding moderate. Fever and exhaustion followed. No albumen in urine. | 132 | **B e** |
| 45 | 10 days .. | Exhaustion..... | Two large calculi. Super-pubic operation required in addition to the perineal one; 1 calculus prostatic. | both, 1515 | **B c** |
| 40 | .... | Dysentery ..... | No albumen: dysentery 3 weeks after operation. | 288 | **B d** |
| 6 | 4 days .. | Peritonitis ..... | Bowels somewhat relaxed; prolapsus ani. | 243 | **B g** |
| 40 | 6th day .. | Exhaustion..... | Little hæmorrhage; no albumen in urine. | 142 | **C** |
| 65 | 3 months. | Dysentery ..... | Never recovered shock of operation; much hæmorrhage; double section of prostate; sloughing of the wound; fever. No albumen in urine. Was admitted at first for hæmorrhoids. | 1704 | **C g** |
| 17 | .... | Cystitis ..... | No apparent peculiarity in the case. | 280 | **C k** |

Exhaustion appears to be the most frequent cause of death: next, probably, subsequent dysentery.* There is one case of peritonitis, and one of cystitis. The former occurred in a case complicated with prolapsus ani, which is, worth noticing, since the peritoneum being probably dragged down by the gut, would be more likely to be wounded in a free incision made at the neck of the bladder.

In one of Dr. Bowie's cases, the kidneys were found diseased. On looking over the table, we find 7 out of 9 cases were patients 40 years of age or more, 1 fatal case at 17 years, and 1 at 6 years. In two or three cases the stones removed would be considered large; in one of three were two large stones, and the super-pubic operation was performed.

* In the cases in Ranking above alluded to, it is found that renal disease is the most frequent cause of death, in adults and aged. Hæmorrhage, pyœmia, peritonitis, and shock follow. Exhaustion, in the strict sense of the word, caused death in but one instance out of the forty.

The chemical composition of the calculus does not seem to influence the result of operation, but the table is too limited to admit of any general deduction being made.

Dr. Simpson's fatal cases rather agree as to the cause of death with the experience here; in 8 cases, 5 deaths were from exhaustion and chronic bowel and spleen disease, 1 case of diseased bladder and kidneys, 1 case of typhoid peritonitis (an old man).

It is shown in Dr. Playfair's paper that in certain districts, calculus is far more common in India than in England generally. With the view of finding the ratio that cases of calculus bore to total Hospital admissions in the Jamsetjee Jejeebhoy Hospital, I made the necessary calculations (see page 147), and found that for 10 years, one case of calculus (urethral or vesical) occurred in about 700 cases admitted. Dr. Marcet calculated that formerly in London Hospitals, one case of calculus occurred in about 500 patients. Without laying more stress than is warrantable on such calculations as these, it yet appears that in Bombay, calculus is not the rare disease it has been considered in the East. On the contrary, it is as common here as in many parts of Great Britain.* In the North-West Provinces of India, cases appear to be still more common.

In the experience of the Norwich Hospital, it was found that in one operation out of about six, more than one calculus was found in the bladder. In 67 recorded cases of lithotomy in this country, two stones were found in eight cases, three stones in two cases, and as many as seventeen in one case; the sum of these proportions is similar to that stated for Norwich. When two calculi are found in the bladder, their size and composition are not necessarily the same; rather the contrary. In 3 out of 5 cases they were dissimilar; in 2, identical in chemical composition, not in size. In one case, 3 calculi were found in the bladder, they are similar in nature, not quite in size. The 17 calculi removed from one patient resemble each other very much in both size and

* The present average number of operations of lithotomy in London is about 40 a year, giving an average of something less than 3 for each of the 15 Hospitals there. This is decidedly below the annual average at the Jamsetjee Jejeebhoy Hospital (see page 147). In England, the number of cases has not been so much diminished by lithotrity as might have been imagined.

composition. Renal calculi appear to have always a similar composition: in 2 cases in this collection, both are oxalate of lime.

With respect to *Sex*, there are but 2 cases of calculi removed from females, being a much less proportion than what is found in England (reckoned at about 1 in 23, I believe); but no doubt this does not express the actual state of things, the prejudices of the native population being an insuperable obstacle to correct information. One of these calculi was removed from the bladder of a Hindoo girl, found drowned; the other was successfully removed from a Parsee woman by Dr. Ballingall. In this last case the nucleus appears to be animal matter, surrounded by urate of ammonia. It has been observed that foreign substances not unfrequently form the nucleus of calculi in women.

Before saying a few words on the theory of the formation of calculus as applicable to India, it may be as well to state that no new species of calculus can be named as peculiar to this country, and (with two very rare exceptions) all the species found in England are also found in India. The only new variety I have had to add to the table taken from the London College Catalogue, is **C c 2**, in which oxalate of lime, phosphate of lime, and oxalate of lime alternate; the specimens are very much alike, and the variety probably uncommon.

Dr. Playfair mentions a *Cystic Oxide* calculus amongst his specimens. Dr. Ballingall removed a small one from the urethra of a Parsee boy, a short time since, and very recently Mr. Hunter (late acting Professor of Surgery to the College), removed a very fine specimen of this kind from a Parsee child, of 4 years of age; it was covered with shining crystals, and weighed three drachms and a scruple. No peculiar symptoms were observed in this case; after the operation, a few crystals of cystine were detected in the urine. This specimen has since been added to the Museum.

**A c 2.** Is a medium-sized calculus, extracted by Dr. Ritchie: it was found *split* into two, in the bladder. The fractured surfaces are covered with phosphates, deposited after the division of the stone. The case is as follows:—"Patient a Banya from the town of Mooradabad, *æt.* 40; symptoms of some years' duration, but the pain for the last two has

been much more severe. He rapidly recovered from the operation." Perhaps the exacerbation of pain referred to, occurred simultaneously with the splitting of the stone.

**Cc 9.** Two small calculi extracted by Dr. Peet at the Jamsetjee Jejeebhoy Hospital. Patient a young man (*æt.* 21) from Kattiawar; symptoms from 10 years; recovery after operation, rapid.

These calculi articulated by a kind of saddle-joint. The larger one is remarkable, from containing in its nucleus a considerable quantity of *silica*. This I suppose is a very unusual circumstance. Simon, however, found a little *silica* in the animal matter of the cortex or crust of a calculus he examined. An interesting circumstance in the history of this case I find recorded in the Clinical Surgical Records; the patient was in the habit of eating *white clay* when very young, and to this his friends attribute his complaint.

There are other instances of articulating and adherent calculi, and several specimens worthy of notice from their size, form, &c.

A calculus weighing upwards of $2\frac{1}{4}$ ounces, and measuring $2\frac{1}{8}$ by $1\frac{5}{8}$ inches in diameter, was removed by Assistant Surgeon Bowie from a Hindoo child, 9 years old, the disease being congenital. The prostate was freely incised, extraction easy, and recovery rapid.

The last-named operator records the only instance of lithotrity I have yet heard of; it was highly unsuccessful.

*Theory of the formation of Calculi, and its application to India.*—If opinion on this subject were anything like uniform in Europe, it would not be difficult to make a satisfactory application of the theory to the circumstances of people so differently situated as the inhabitants of India. From the facts stated at the commencement of this paper, I consider it warrantable to conclude that there is a greater tendency to the formation of oxalate of lime in the urine here than in England, and that, at the same time, the amount of uric acid, or urates, is proportionately diminished. A partial explanation of this latter circumstance may be found in the facts, that rich animal food is much less used here than in England; that the waste of the albuminous and gelatinous tissues is also less active; and lastly, that by the copious perspirations inevitable in this climate, a considerable amount of organic matter is got rid of, which, under other circumstances, would pass off in the urine, as urates.

But, as I have already stated, there appears to be a *substitution* of oxalic for the uric acid. To what is this owing? Oxalate of lime, or oxalic acid, is not quite a normal ingredient in the urine; it is apt to appear, however, with a very trivial change of circumstances; first, it may clearly be derived from the soluble oxalates taken in the food; but if this were the only source, or the chief source, of oxalate of lime, we should still be unable to account for the marked diminution of uric acid which also occurs. This too would be the case, if Dr. Prout's theory were solely correct. He considered that oxalic acid was one of the results of imperfect conversion of the food in the stomach (indigestion in a word); vegetable, or saccharine and farinaceous food, is meant. On the other hand, the intimate relation between uric and oxalic acids,—and, considering how closely related urea and uric acid undoubtedly are, it might be said between urea and oxalic acid also,—furnishes a far more plausible ground of explanation. The facts previously mentioned should be borne in mind. Now, Liebig considers that oxalic acid arises from the imperfect oxidation of uric acid during the metamorphosis of the effete tissues of the body. If the supply of oxygen fails to a certain extent, the products of combustion in the lungs are urea, oxalic acid, and the substance called alantoin. It is only stating the idea in another form to say, with Lehmann, that the kidneys vicariously excrete carbon, when the function of the lungs is impeded, or oxygenation deficient in the body.* The application of these remarks to the case of inhabitants of tropical climates is obvious. Here, we might say, is another instance of the effects of diminished respiratory function, and it would be exceedingly interesting to have this opinion still more confirmed.

Lastly, it may not be irrelevant to this subject, to occupy a little further space, by quoting a short passage from Dr. Prout's work on "stomach and renal diseases." He says:—"I have no hesitation in expressing my belief, that almost all forms of disease connected with the development of oxalic and lactic acids are more frequently excited by malarious influence, than by any

* Oxalic acid ($C_2 O_3$) replacing carbonic acid ($C O_2$).

other external cause. My attention was forcibly directed, many years ago, to this fact, by seeing, in quick succession, several well-marked cases of oxalic acid disease from a district notoriously malarious. Having being thus accidentally led to observe the circumstance, a number of corroborative instances soon occurred to me; and when, shortly after I had begun to consider the point as established, the Asiatic cholera made its appearance in the country." Dr. Prout observed the urine of patients at this time to alter its character, losing the common lateritious deposits, and assuming the appearance of urine containing oxalate of urine. At this time too, and a little afterwards, more cases of oxalate of lime, renal calculi, and formidable hæmorrhage from the kidneys were seen than he had ever found before. As the cholera diminished, the above state of things subsided.

Again he says—"The most striking exciting cause of the oxalic diathesis is a residence in a damp and malarious district, which acts too as a pre-disposing cause."

These remarks are certainly worthy of our attention, and seem to acquire confirmation from what has been stated above, as to the more frequent occurrence of oxalate of lime calculi in the Concan, Scinde, Cutch, and Guzerat, as compared with the Deccan. The possible production of oxalic acid from urates was unknown to Dr. Prout, and he does not, as far as I see, attempt to explain the empirical observation just quoted.

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## APPENDIX 1.

Since this paper was written (July 1859), several calculi have been added to the museum, 3 by Sub-Assistant Surgeon De Souza, one of which is a perfect specimen of the mulberry calculus; the nucleus of another appears to be formed of oxalate of lime. Other specimens have been obtained from the Jamsetjee Jejeebhoy Hospital, including the cystic oxide calculus; and 2 are from Dr. James, of Dhoolia.

In the last number of the Transactions (vol. 4, New Series, p. xvi.) there is a table of 18 cases of lithotomy, performed by

Assistant Surgeon Stedman, at Hyderabad in Scinde: mortality 1 in 6. This number of cases occurred in a period of 6 months, and tends to confirm the opinion that calculi are more frequent in Scinde than in some other parts of the Presidency.

In a late communication to the Secretary,* Dr. Stedman states:—"This year, out of 32 operations, I have lost only one." This result must be looked upon as highly satisfactory, and is of course far more favourable than the previously recorded experience. In this "vexed question" of the mortality of lithotomy, there is considerable difficulty in distinguishing the cases fatal from operation only, and those fatal from complications. The point to be settled is,—are such complications the *result* of the operation or not?

It may be further added, that the mortality at the Jamsetjee Jejeebhoy Hospital before stated is greater perhaps than some surgeons would have reckoned from the same data.

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## APPENDIX 2.

*Analysis of Surgeon Ritchie's Cases* (9).

| Age. | Caste. | Residence. | Duration of Symptom. | Result of Operation. | Weight of Calculi. | Species of Calculi. | |
|---|---|---|---|---|---|---|---|
| | | | | | Grs. | | |
| *15 | Hindoo .... | Shonjabad . | 4 years.. | Post mortem (2 c).. | 1143 | A c | A 3 |
| 40 | Ditto | Moradabad. | Some years. | Recovered ..... | 730 | A c | |
| 40 | Mussulman.. | Mooltan .. | 3 years.. | Died exhausted .. | 374 | A i | |
| 6 | Hindoo .... | Moradabad. | ? | Recovered ..... | 74 | B b | B 5 |
| 12 | Ditto | Mooltan .. | 8 years.. | Recovered ..... | 439 | B g | |
| * | Same case as above .. .. | | | ..... | 750 | B i | |
| 14 | Hindoo .... | ? | 10 years.. | Recovery ..... | 142 | B k | |
| 20 | Hindoo .... | ? | 8 days .. | Recovery ..... | 24 | B b | C 1 |
| 30 | Mussulman.. | ?. | ? | Recovery ..... | 610 | C b | |

*Remarks.*—Out of 7 operations, 1 death.

A small proportion of calculi with oxalate of lime nuclei.

One case in which two calculi were found of different composition.

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* *Note by Secretary.*—For table of operations of Lithotomy performed in 1859 by Dr. Stedman, Hydrabad, see Appendix *post*.

## APPENDIX 3.

*Analysis of Assistant Surgeon Bowie's Cases* (26).

| Age. | Caste. | Residence. | Duration of Symptom. | Result of Operation. | Weight of Calculi. | Species of Calculi. | |
|---|---|---|---|---|---|---|---|
| | | | | | Grs. | | |
| 30 | Hindoo .... | Guzerat .. | 6 years .. | Recovery ..... | 360 | A a | A 4 |
| 5 | .... | Kutch .. | 3 ,, .. | ,, ..... | 145 | A a | |
| 8 | .... | Ditto .. | 2 ,, .. | ,, (2 Calculi).. | 45 | A a | |
| 45 | (Policeman). | Scinde .. | ,, | Died—Kidneys deseased. | 750 | A a | |
| 35 | .... | Scinde .. | 4 years .. | Recovery ..... | 705 | B | B 13 |
| 14 | .... | Guzerat .. | 2yrs.3mths. | ,, ..... | 120 | B | |
| 5 | .... | Scinde .. | ? | ,, ..... | 88 | B | |
| 9 | Hindoo .... | Guzerat .. | Congenital. | ,, ..... | 1020 | B a | |
| 34 | .... | Scinde .. | 7 years .. | ,, ..... | 900 | B b | |
| ? | (Prisoner) .. | Ditto .. | 4 ,, .. | ,, ..... | 1020 | B b | |
| 43 | Hindoo..... | Guzerat .. | 6 ,, .. | ,, ..... | 700 | B b | |
| 7 | .... | Kutch.... | Congenital. | ,, ..... | 102 | B b | |
| 2 | Hindoo .... | Ditto .. | ,, | ,, ..... | 45 | B b | |
| 3 | .... | Scinde .. | ,, | ,, (2 stones).. | 60 | B b | |
| 30 | .... | Kutch .. | Longstanding. | ,, ..... | 235 | B b | |
| 27 | .... | Scinde.... | 3 years .. | ,, (2 stones).. | 600 | B f | |
| 4 | .... | Kutch.... | ? | ,, ..... | 165 | B i | |
| 29 | .... | Scinde .. | 5 years .. | ,, ..... | 1020 | C a | C 9 |
| 32 | Hindoo .... | Guzerat .. | 4 ,, .. | ,, ..... | 400 | C a | |
| 29 | .... | Kutch.... | Congenital. | ,, ..... | 990 | C c | |
| 39 | .... | Ditto .. | 10 ,, .. | ,, ..... | 1200 | C c | |
| 6 | .... | Ditto .. | ? | ,, ..... | 448 | C c | |
| 30 | .... | Scinde .. | 6 years .. | ,, ..... | 560 | C c | |
| 49 | .... | Ditto .. | 9 ,, .. | ,, ..... | 1440 | C h | |
| 17 | .... | Ditto .. | 3 ,, .. | Died—Cystitis .... | 280 | C k | |
| 29 | .... | Guzerat .. | 5 ,, .. | Recovery ..... | 160 | C c 2 | |

*Remarks.*—Out of 26 cases, 2 deaths. Proportion 1 in 13.

A large proportion of calculi with oxalate of lime nuclei.

Three cases in which two calculi were found.

# ANNUAL REPORT OF THE 1st BOMBAY EUROPEAN REGIMENT (FUSILIERS).

*For the Year* 1858-59.

Presented by the Director General, Medical Department.

## I.—*Head Quarters* (*Mooltan*), by D. Costello, M.D., Surgeon.

The Head Quarters and Right Wing of the Regiment having been stationed at Mooltan during the past official year (with the exception of ten days employed in its transit down the Indus), it will be unnecessary for me to recapitulate the means employed to afford food and shelter to the European infantry at that station, having already done so in my last yearly report, especially as up to the date of departure no measures were taken to provide permanent barracks. Several iron barracks were in course of erection, but the work was suspended in consequence of the failure of the contractor, and the unmistakeable want of energy on the part of the Executive Engineer, who allowed the cold season to elapse without making any exertion to have the buildings finished.

During the past year, the health of the men suffered much from severe duty, and from over-crowding in unsuitable barracks, where they breathed a vitiated atmosphere which favoured the universal spread of scurvy. The supply of malt liquor also unfortunately failed, and they were, from May till December, deprived of their favourite beverage; a deprivation much felt by men suffering, most of the time, from the effects of intense heat and its consequent exhaustion.

On the arrival of the V Battery of Royal Artillery in May 1858, the Fusiliers vacated the Artillery Barrack, and were transferred to two small temporary infantry barracks just completed, and calculated to contain fifty men each;—a part were also lodged in a miserable building intended as a gun-shed. The latter building had a damp mud floor below the level of the ground outside,

and was situated close to the artillery stables, the ammoniacal smell from which was perfectly overpowering. The place ought not to have had more than 30 occupants, but it has contained, on an average, 71 men, or 133 per cent. more than its proper complement. The building may be pronounced as one of the worst make-shifts for a barrack ever seen.

During the commencement of the hot season, sickness increased considerably from the overcrowding of men in those unsuitable buildings, the evil being further augmented by the authorities at Kurrachee sending up additional men, although it was strongly represented that there were more soldiers at Mooltan than accommodation had been provided for : however, this evil was remedied by reinforcing the wing at Umritsur with the surplus men. During the entire hot season and autumnal months, the appearance of the men, thus cooped up, daily deteriorated ; and by October, full 76 per cent. showed symptoms of scurvy, whilst open ulcers were common in the ranks. The want of plunge-baths, or of even proper wash-houses, doubtless aggravated the evil ; for although upon my representation plunge-baths were sanctioned by the supreme Government, yet, owing to obstacles furnished by the Engineer Department, they were never constructed. At the commencement of January, Dr. McKinnon, Inspector General North-West Provinces, then on his annual tour, received instructions from the Lieutenant Governor of the Punjab to inspect and report on the sanitary state of the Regiment. Having visited the Hospital, and having had the Regiment paraded on three different occasions, the Inspector General, out of a strength of 400, selected 110 men with symptoms of scurvy, and considered that every other man was recovering from, or had traces of the disease, although during the preceding two months the Regiment had the benefit of bracing climate with abundance of choice Europe vegetables. The Inspector General visited both the occupied barracks as well as those in course of construction, and pronounced the entire buildings unsuitable for the accommodation of European troops, thus confirming my representations by the sanction of his authority and by the weight which the opinion of an officer of his rank and reputation afforded.

During the past year, the average strength of the head quarters' wing of the Fusiliers has been 474, which is a few in excess of former years: the number of cases admitted being 1,397, as compared with 1,853, the number of the previous year.

The deaths have been,—3 from remittent fever, 1 from chronic hepatitis, 1 from chronic dysentery (in both these last cases, several abcesses existed in the liver); 1 death took place from acute dysentery, and 4 deaths from apoplexy,—3 of the fatal cases of apoplexy occurred during the intense and sultry heat at the commencement of July. At that time, the disease was prevalent both at Mooltan and Meean Meer,—several Europeans having died at the latter station. The deaths from delirium tremens were two; both of these cases were canteen sergeants, who, from their employment, were enabled to indulge in spirituous liquors without detection; they were brought into hospital in the last stage of the disease. The death of these men, with that of a canteen sergeant at Umritsur from the same cause, makes 3 deaths from drinking amongst canteen sergeants in 18 months, or, in other words, the canteen has caused the death of a non-commissioned officer every six months.

Notwithstanding the extensive inundations from the Chenab,—the waters of which, during the past season, exceeded their usual average height,—the admissions under the head of fevers have been much less than those of the preceding year. This decrease of admissions from this class of disease is entirely owing to the small fall of rain which took place last year; and it is well known to all who have, for many seasons, watched the outbreaks of fever which annually take place in alluvial countries, that the prevalence and intensity of the fever is always in proportion more with the fall of rain than with the height of the river inundation. During the autumn of 1856,—following a heavy fall of rain,—in two months, a full eighth of the adult population of Mooltan was swept away by fever.

Thoracic diseases are of frequent occurrence throughout the Punjab during the cold season, more especially as accompaniments to intermittent fever, and are generally obscure in their symptoms. I have detected, by the clearest physical signs, the existence of extensive pneumonia during fever, although the

respiration was but little affected and cough nearly absent. These intercurrent affections generally yielded to counter-irritation, and the administration of quinine combined with antimonials.

The cases of dysentery were frequent, and, when occurring in scorbutic subjects, particularly severe. From the first appearance of the disease, there was considerable griping and purging;—the stools consisted of dark coloured blood, mixed with slime;—the motions after a short time were fœtid, and resembled beef washings;—the pulse became rapidly small and feeble;—prostration of strength and depression of spirits ensued;—the tongue was dark and coated;—the surface covered with cold perspiration. The treatment found most successful in these cases was, the administration of 5 grains of Dover's powder and 5 grains of catecheu, every third hour, washed down with a glass of strong decoction of baêl fruit, and warm turpentine stupes to the abdomen,—the strength being supported by beef tea and wine. In all these cases, which terminated successfully after a period of from six to eight days,—the violence of the symptoms being then subdued and convalescence having commenced,—a recurrence of griping invariably took place; but after the administration of oleum ricini ʒvi, or sulphur ʒiv, the griping was relieved by quantities of hardened yellow scybellæ being passed. In some cases, a return of griping, with consequent passing of hardened fæces, occurred three or four times. Cases of diarrhœa occurring in scorbutic subjects were treated with decoction of baêl.*

Mooltan has hitherto been singularly exempt from attacks of epidemic cholera, although, about five years ago, the violent purging and vomiting which often attend the bilious remittent fevers of the place were mistaken for cholera, and officially represented as such. This singular immunity from the disease also existed during the period of the Sikh Government, although at that time and subsequently both Lahore and Umritsur were notorious for the frequency and severity of the disease. During the present

* I would much wish to see this valuable fruit used in our jails, in many of which, I believe, scurvy to be the cause of much of the dysentery and diarrhœa met with amongst prisoners. The baêl is plentiful in all the bazars throughout the Punjab and North-Western Provinces. It is not procurable in Kurrachee, although the tree has been lately introduced there from Cawnpoor.

season, with the exception of Mooltan, the entire of the Punjab was traversed by cholera;—the disease appearing in its severest form amongst the Europeans at the sanitary station on the Morree Hills. Two cases of sporadic cholera were treated in March; the men were both sickly, with broken down constitutions. The disease, although well marked, was easily subdued by the administration of 20 minim doses of chloroform in a little brandy, which allayed the cramps, re-established the circulation, and induced sleep.

Under the head of "Diseases of the Brain," there were 13 cases of cephalalgia. In treating this disease, where there was no coating of the tongue or prominent symptoms of derangement of the mucous membrane, the greatest benefit was produced by giving four times a day, 30 grains of the muriate of ammonia in a little mint-water or in some bitter infusion. There was one case of sun-stroke; the man was attacked about 5 o'clock P.M.,—the countenance was flushed,—the pulse small and wiry,—surface intensely hot,—the teeth clenched,—with loss of consciousness and occasional convulsions, followed by hysterical sobbing. Cold affusions, alternately applied to the head and chest, were used from 5 o'clock P.M. till 11 o'clock P.M.; always waiting when the heat of surface was reduced for a return of warmth. Frictions to the limbs were applied, and when the power of deglutition returned, brandy and ammonia with water was freely given, first with a spoon, and afterwards in increased doses. Under this treatment the case terminated favourably.*

In a climate where the variations of the thermometer are so great as at Mooltan, rheumatism is of frequent occurrence, particularly attacking, during the cold months, men suffering from scurvy. In this particular form of the disease, I found saturating the system with fresh limejuice ℥i every second hour to be the only successful treatment. A great number of cases under the head of chronic rheumatism were connected with secondary syphilis: these cases were very unmanageable, the almost univer-

* When moving with troops in the field,—as the readiest plan,—a hole should be dug in the ground, and the patient laid in it in a recumbent position and well deluged with water, at the same time supporting his strength with a little brandy: this will be found a simple and ready method of successfully treating this disease.

sal prevalence of scurvy prohibiting the employment of the usual remedies.

Under the head of "Venereal Affections," there has not been much difference in the total of admissions. Cases of primary syphilis were, as usual, much milder than the disease as it generally appeared in Sind, neither did those sloughing ulcers of the penis with low irritable fever appear, as was so frequently the case in Kurrachee. The cases of secondary syphilis were severe, some of them went into the tertiary form. During late years, secondary syphilis is daily becoming a disease of more frequent occurrence in European hospitals, in consequence of the prevalence of the practice of healing the primary sores without mercury. In some cases the primary disease was said to have been contracted years before enlistment.

During the last ten months, all gonorrhœa cases occurring amongst the patients in my ward have been treated after Dr. Skey's method. The history of a soldier suffering from gonorrhœa is frequently as follows. After contracting the disease he will, if possible, conceal it, in order to avail himself of the hospital to save him from punishment drill; or, if he has not been drunk, he remains in barrack till the disease is detected, frequenting the canteen, and hoping to get cured secretly. He at length comes into hospital with the disease well established, under the form of a purulent discharge with inflammation. If the disease was seen in its early stage, the practice formerly was to give cubebs and he was often freely purged; the disease not disappearing he then had balsam of copaiba; dilutents and spoon diet were ordered from the commencement, and this was often followed by strong injections of zinc or nitrate of silver. After some eighteen or twenty days, the patient left the hospital cured of the gonorrhœa, but, pale and weakly, and sometimes returned with a stricture. Now, a patient on admission is at once placed on full diet,—if weakly, beer or wine are allowed, and quinine with iron given, at least 5 times daily. An injection consisting of half a grain of sulphate of zinc to one ounce of water, sometimes alternated with a weak infusion of green tea, is used. Should chordee be present, a little camphor and conium at bed time are prescribed; and the cold bath is used daily from the commencement.

Under this plan of treatment the patient is cured in about half the time formerly required, and is discharged from hospital a healthy man. Amongst the men treated under this system, I have not had a single case of stricture.

There were three gun-shot wounds received during the outbreak on the 31st of August; in one instance, the femoral artery was divided, and the lower end of the femur fractured. Amputation of the thigh by the circular method was immediately performed,—the man at the time suffering from scurvy. Notwithstanding that the stump was bruised, and the bone forced through two days after the operation, by the man jumping from his cot at night in consequence of a false alarm of an attack by the 6th Irregular Cavalry, the stump healed well, and was sufficiently covered. The second gun-shot wound occasioned a fracture of the radius. The third was a bad wound close to the external malleolus of the right leg: great sloughing took place, extending up to the calf of the leg; and as the man was suffering from scurvy, he was, after some time, sent down the river to Ghizree where the wound healed.

There were some severe cases of cynanche tonsillaris accompanied by low fever and exudation of lymph. These cases received marked benefit from the carbonate of ammonia given in three-grain doses every fourth hour, and the application by the finger of the powdered muriate of ammonia in substance, to the tonsils,—at the same time supporting the strength by beef tea and wine.

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II.—*Left Wing* (*Umritsur*) *by* Assistant Surgeon J. F. Straker.

The wing remained at Umritsur, 30 miles east of Lahore, in the Punjab, for nearly the whole of the year. This stationbeing very new and never occupied before the mutiny by European Infantry, had no suitable barracks whatever; the only building at all available being the two late native hospitals. Into these, all the men, with the exception of 90 who formed part of the garrison of the fort about a mile off, were crowded for the greater part of

the time:—that is to say, nearly 300 men were lodged where about 100 ought to have been placed. For the hospital, there was a still worse, though quite as an inevitable, arrangement. A former quarter guard, and a staff serjeant's bungalow about 200 yards from it, formed the only accomodation for the sick of the wing; from there being no hospital in the fort, the sick from the detachment there were also brought into camp. I did not hesitate to make strong representations on the subject to—not the brigade authorities only—but also to the division, urging the importance of one of the new barracks being completed at once, or of some house in cantonment being rented as had already been done for the sick of the Artillery. I also, in my weekly and monthly reports, drew the attention of the superintending surgeon to the various inconveniences of the place from time to time, but without effect. Towards the end of September, one of the new barracks was at length finished, and half the men being put into it I was enabled to move the sick into the native hospital, which, though not itself a proper hospital, was in every way superior to what we had during the hot weather.

It will be seen by the Tables that the deaths have been almost entirely from one class of disease,—acute dysentery and acute hepatitis generally the result of acute dysentery. This last disease was of a severe and most obstinate type; and finding that almost every case admitted came from the fort, and pursuing my inquiries, I discovered that at the main guard of that place, where an additional night picquet was brought on, there was not room enough in the guard room for the cots, and so half the guard slept outside in close proximity to the fort ditch, which was always damp, and became during the rains a swamp. From the frequency of this disorder therefore (every case but one, I believe, being traced to the fort, and all said to have slept in the manner stated), I concluded that some malarious influence was thus attacking man after man with this fatal disease, though the depth of the ditch rather went against the generally received opinion as to the height to which malaria can rise. Out of 34 cases treated, there were 7 deaths, or nearly 20 per cent. In four of these, perforation had taken place before death: in two, the

intestinal walls about the cœcal portion were hardened into cartilaginous tissues: in all, there were sloughing ulcers spread more or less through the large intestines. Two of them had head symptoms before death, such as convulsions and delirium. I treated none of these cases with any antiphlogistic remedy, except one, in which salivation and sore gums ensued after the administration of only twenty grains of calomel. The usual treatment was three grains of blue pill, and a grain or a grain and a half of opium twice a day, followed by an ounce of castor oil early the next morning. If in 3 or 4 days the character of the stools remained unaltered, then Twining's pill was given with the addition of half a grain of opium, for it appears that opium has not the same effect in this country as in a colder climate, and a larger dose is almost always necessary before the usual effect is obtained. The castor oil was then given every 3rd or 4th day, and warm water injections of half a pint, with tincture of opium one drachm, were administered either once or twice a day, according to the tenesmus. If the disease gave no sign of surrender by the 7th or 8th day, I then had recourse to gallic acid internally, and injection of nitrate of silver in conjee, increasing from a quarter to two grains, always combined with opium, and alternated with plain hot water enemata, administered with Reid's long pipe. At the same time when tenderness of any portion of the colon appeared, it was met by the application of leeches or a blister proportioned to the strength or condition of the pulse of the patient. The diet was, of course, farinaceous from the first; but when the pulse became at all weak or compressible, port wine was ordered, and particular care taken that the usual amount of beef tea was taken. When the discharges ceased to be fœcal, were accompanied with constant tenesmus, and contained much blood, the enemata were given every two hours, and mixed with mucilage, white of egg, or catecheu. Nitrate of silver, or sulphate of copper, or acetate of lead was then administered by mouth, while ammonia and wine were given at frequent intervals to keep up the strength of the patient. The fatal cases were of short duration; the dose of poison seemed too strong to be checked by any remedy, and the disease seemed to run

its course uninfluenced by any treatment. The cases that recovered, only did so very slowly and uncertainly, requiring support through every stage and the most careful regulation of diet.

The fever cases, though numerous, never were of a dangerous kind; many of them were men sent up from Mooltan who had had repeated attacks during the previous year. The head was never very much affected, and paroxysms were generally of not more than four hours' duration. If the patient had the least inclination to vomit, or showed any sign of biliary derangement, I always gave an emetic at once, followed by a strong purge if the bowels required it, and then five or ten grain doses of quinine administered steadily at all periods of the attack. I generally found that, under this plan, the fever was checked after the 3rd or 4th day, but I am very doubtful whether the larger dose prevented an earlier recurrence of the attack during the succeeding month or not, the cases varied so completely. The administration of arsenic was tried in some cases; that is, after the fourth day from the cessation of the paroxysm, the quinine was omitted, and a solution of arsenic ordered and continued for a week or a fortnight. I cannot, however, state that this had any decided prophylactic effect. The cases came in again just as soon.

Two men died from abscess in the liver; one of these clearly followed ulceration of the large intestine, as shown by the *post mortem* appearances; the other lingered for a long time, with frequent re-accession of the disease,—the liver was found studded with small abscesses. There was one more death from the same cause, but the man died after we had marched from Umritsur, and so his death is not recorded among the rest. I heard subsequently from the garrison surgeon, in whose charge he was left, that a very large abscess was found in the liver.

The fatal case of delirium tremens reported was an unusual one, and scarcely answers to the name. The man was a canteen sergeant, and had given way to the opportunities his office afforded him of drinking an immense amount of liquor; and, from different accounts heard after his death (for he was too short a

time in hospital for me to get the history of the case from himself), it appears that the drinking he had indulged in, had not produced delirious symptoms but had made him sleep heavily. On admission, the usual delirious symptoms were not at all marked, but the pulse was very feeble, and he was too weak to get out of bed. One ounce of brandy with fifteen drops of laudanum and five grains of ammonia were administered every two hours, but without any change for the better or worse;—he rather unexpectedly died about 36 hours after admission. A good deal of watery effusion was found on the surface of the brain, and some in the ventricles; the cerebral substance was much softer than usual, and did not present many bloody points.

The large number of fatal cases thus induced (namely three in eighteen months), makes me mention the circumstances the more prominently, as I cannot but think that some measures could be devised to prevent this great and apparently quite unnecessary sacrifice of some of the best men in the regiment; for the canteen sergeantcy seems to be allotted as a kind of reward to the steadiest and best men of the longest service, whose previous good conduct, however, seems literally unequal to the great temptation of a free access to liquor. The other four cases of this disorder treated were not severe, and readily yielded to the administration of brandy and laudanum, as above detailed. In fact, I am glad to report that the amount of hard drinking was nothing compared to the former year, and that was entirely due to the arrival of a large number of invalids in the station—the survivors of the siege of Delhi, whose large amount of plunder and excited feelings led to immediate and extensive fraternisation with our men, and, consequently, an unusual amount of drunkenness.

Some new medicines supplied from the medical stores at Sealkote, and recommended to be used, in circulars from the Director General, have been tried. Some of these, such as atees, were only given in lieu of medicines which had been used or destroyed by the mutineers, and the stock of which could not be replaced immediately. Atees was given because no quinine was left. I tried it frequently, but without being able to educe any

febrifuge properties. As a tonic, given after the cessation of the febrile attacks, I believe it to be an excellent medicine.

Bal or Bael powder (recommended by Lieutenant Pogson to the Director General, and especially directed to be tried) was supplied from the stores as prepared by Lieut. Posgon who advertises and sells it as an infallible remedy. I used it, as directed, in several cases of acute dysentery at the outset of the disorder, but found it so useless, that I was compelled entirely to set it aside in any case of actual dysentery. In simple diarrhœa, I think it has a powerfully astringent effect, and, as such, is an efficacious preparation in those cases for which astringents are suitable. But as, in the majority of cases of looseness of the bowels, I prefer many other remedies to astringents, I cannot call it a very valuable addition to the list of drugs.

Kameela was tried in many cases of tapeworm, and, as far as I could judge, it drives out the greater part of the worm; but I cannot state that I have yet seen the head expelled by the administration of this native medicine; this may be due to the way the worm is washed and kept by the sweepers.

In this portion of my report, I would beg respectfully to point out that there is a drug supplied to hospitals in the Bengal Presidency which is not given here,—the citrate of iron and quinine,—in the efficacy of which I have great faith, and would willingly see it used much more extensively.*

No corporal punishment was inflicted or awarded during the year; indeed the whole conduct of the wing was excellent, and was much noted and frequently spoken of by the officer commanding at the station.

Variola appeared in two men while they were in hospital, but they were at once separated and kept in large separate rooms with every precaution to avoid contagion:—the disorder did not spread further in the corps. One of the officers had the mildest attack I have seen, the eruption appearing only on the face, and that very sparingly. On the 9th day of February we marched for Mooltan, which we reached on the 31st. The mornings were most healthily cold, and there was little sickness. The

* *Note by the Secretary.*—Citrate of iron and quinine is procurable from all the medical store depôts, upon indent in the usual manner.

last fatal case occurred from hepatic abscess about 3 marches from Mooltan:—the man had been ill for some time before we left Umritsur.

Reports for the months of February are not included, as we had then rejoined the head quarters of the wing.

Four officers were brought before a standing medical committee during the year, and sent for change of air to Europe.

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## III.—*Depôt at Kurrachee*, by D. Grierson, M.D., Staff Surgeon.

As in the previous year, the depôt was composed of men left in quarters when the Regiment went to Mooltan. Many of these were men whose length of service or infirmities made them, as soldiers, little desirable to be taken on active service. Ninety-nine recruits joined in the year. These men arrived in February 1859, and were a part of the strength only for two months preceding the return of the Regiment and the breaking up of the depôt. Besides these two classes, men were often sent down sick from Mooltan, some were returned from Ghizree, and some also in fewer numbers from India. With exception of the recruits,—who it is seen were but a little time attached,—"the strength" consisted of men very far below the average health of the regiment generally. That this fact should be borne in mind is necessary, when the high proportion of "treated to strength" is regarded. But for this state of the depôt I have explained, it might be supposed that the climate must be highly prejudicial, when out of a "strength" of 103 the number of "treated" sent to Hospital amounts to 334; in other words, where every man, on an average, had been three times, and some oftener than three times, in Hospital. This would be worse than some of the worst jails, and speak as badly for the climate as the number of sick speaks for the sanatory arrangements of those institutions. The composition of the strength, however, shows the cause of this high degree of sickness, and there is no need to accuse the climate or to institute comparisons. "The strength." as above stated, has been 103. The number of "treated" has been

334; of these, three died. The "average daily sick" during the year was 10. From these facts, it follows that the proportion of sick to strength per cent. is 324·2; of deaths 2·9; of deaths to treated 0·8; and that the relation of mortality to strength is not excessive, and in regard to sickness, small. Nine men were invalided from the depôt. With respect to those men who proceeded on sick leave—in number 21,—or who were transferred—in number 66,—they were almost entirely men who came from head quarters and passed through the depôt hospital on their way to their destination. The exceptions to these were men of the depôt who were sent, some to Ghizree and some to Poorundhur.

The sick, when formed into groups in the order of their relative numbers, were as follows:—fevers 108; diseases of the stomach and bowels 44; rheumatic affections 39; wounds and injuries 16; venereal affections 15; abscesses and ulcers 15; diseases of the lungs 14; diseases of the brain 14; diseases of the liver 14; dropsies 7; ophthalmia 5; diseases of the skin 1; after which there remains of all other diseases, 42.

*Particular Diseases.*

*Fevers.*—Fevers form the largest group of diseases treated during the year. These are mostly of the intermittent type, and consequently of a preventible nature; and if these fevers were removed, a diminution of about one-third of the sick in Hospital would take place as the immediate effect. Indirectly also there would be an improvement, for many are reduced by fever to a bad state of health, and often gain admission to Hospital for other complaints, the effects of repeated attacks of fever. It can scarcely be doubted that prevention is possible. Of the diminution of the amount of fever there can be no doubt. The analogy of other places would prescribe for the attainment of these results,—the drying up of the swamp, and the planting of trees around the cantonment. Fevers of a type in severity resembling what were formerly observed are now rare. I have seen accessions of fever recur with regularity and severity, yet not with intensity to occasion alarm. It would happen, however, at times on some return of the usual accession,

that the patient became dull, difficult to rouse, easily falling again into sleep or stupor, and this might be changed into coma or death; or again there might be a state of wakefulness, absence of pain, and of all natural desires; when roused, dull consciousness; and sooner or later, death. These cases are now very rare. Cholera also for some years has not been observed except in doubtful sporadic cases. These facts I look upon as results of measures taken to preserve a purer air in cantonments, and they afford a proof that the adoption of other means might possibly be equally effective, in the removal of fever.

I have little to say in the way of treatment. No difficulty exists in the treatment of ordinary fevers. Discrimination is wanted at times to distinguish a complicated case from many simple ones; and care is required not to apply means useful perhaps in robust or young patients to men of exhausted powers, the results of disease or of age. To observe also when a fever takes the ordinary course, and gives the usual good hope of a speedy termination, and when it goes beyond these limits, and then to interpose with effect and influence the threatened unfavourable or less favourable result, is the office of a sagacious, experienced physician, and calls for attainments which certainly may often be exemplified. What is the best mode of the treatment of fever, is a question which perhaps every one has entertained, and which one might think ought to have been settled. Opinion and practice differ on these points to this hour. The question is not unimportant. This will appear if the conditions requisite to a good cure are specified. These, it is apprehended, are the certainty of it, with least detriment to the living powers of the patient, with least loss of time, and with least expenditure of money. The means which secure these various advantages in each individual case, are no doubt the most efficient for all purposes; that is,—the best. And that opinion should vary in the choice or estimate of these means is not because attention to these points is overlooked, but because difference of patients in the circumstances in which they are placed, the diseases with which they are affected, and the previous and attendant conditions as to health (and the agencies which act on it) they have experienced or are subject to, render a perfectly fair and unex-

ceptionable comparison almost hopelessly difficult. It remains only that every one exercise, each in his place, the judgment he is supposed capable of,—the discrimination his functions demand of him,—the keen perception of altered conditions and the ready adaptation of means to suit the new requirements brought before him,—and that he study to accomplish under every variety of complication or intensity that which he is ever supposed to keep steadily in view, namely, the cheapest, quickest, safest, and surest cure. For working out these results, those in the places of highest influence, opinion, and consequently practice, generally seem disposed to confine themselves within a narrower range, and trust more hopefully to the restorative powers of nature in disease : and this, it is said, is not to curtail the scope or utility of art, but to give it a surer basis and a higher elevation. This altitude of the professional man is commendable in one point of view. It puts him in the position to realize what in medicine as in morals is the very first principle of duty,—"*not to do evil.*" Perhaps it may be said also that it puts him on a watch-tower, where he sees clearly the first moment and the best method of interposing with effect and doing so in the use of those means which he knows will accomplish the indication he desires, to fulfil it without the risk of any attendant injury. If so, then he meets the requirements of the second great canon of duty, and fulfils the more arduous and nobler part of "*doing well.*" No art can go beyond this, and the method that secures these results partakes of art and science too.

Out of 108 cases treated, no fatal cases occurred ; of 103 admitted the average age was 26 years, and the average of days under treatment was 7. These facts denote the character of the fevers of this place perhaps better than a detailed statement.

*Diseases of Stomach and Bowels.*—The diseases of the stomach and bowels amount in number to 44. Many of these cases might, without impropriety, have been placed under the head of fever. The combination is not unfrequently seen ; and the causes I believe are uncertain. Where fever often occurs it induces dyspepsia and leads to diarrhœa; and when this state supervenes, the diarrhœa may be the most prominent feature of the patient's illness, or it may be the only one that attracts notice.

There are chronic cases of the disease, and indeed, except in recruits, it is rare to witness diarrhœa in an acute or sthenic form with febrile heat or excitement of pulse, when it becomes what would perhaps be in strict propriety called dysentery. Diarrhœa is a disease not unfrequent in this place. It is the sequence of many a chronic disease, and the slow descent that leads many to the grave. Those newly arrived seem most subject to it; and, in popular opinion the water is assigned as the cause. The water contains a large amount of saline matter, and is therefore not good, and this, with the impure air varying at different times, may be justly looked on as injurious. That those longer resident are less sensibly affected is consistent with the fact observed, that people, inhabitants of unhealthy localities, become the subjects of a permanently low condition of health and vigour, whereas casual or temporary comers are attacked with more active forms of disease. The older residents pay as it were a regulated tax on health from year to year, but new settlers very often are mulcted in a heavy demand at once, and then subside into the class of "normal rate-payers." In this local cause of bowel complaints we find a strong motive for endeavouring to procure a copious and wholesome supply of good water for this place. That due pains have been taken in this matter, the means to decide are wanting; but rumour indicates that at least efforts have been made to procure power to make the inhabitants pay for it.

Of diarrhœa, 29 cases were treated; aged on an average 24 years, and under treatment on the average 5 days. One death occurred in this disease, in a phthisical man, worn down with long illness, and who was admitted in a hopeless condition.

*Rheumatism.*—Of rheumatic affections there were 39 cases. Acute rheumatism is very rare, and the chronic forms are very various, not usually severe, yet often persistent and very distressing.

*Wounds and Injuries.*—Wounds and injuries succeed next in number, of which little need be said. The gun-shot wound was that of a man admitted from Mooltan, wounded in the mêlée there. The fracture was said to have been occasioned by a fall. It was that of the forearm, and did well.

*Abscesses and Ulcers.*—Abscesses and ulcers, which are next, were of merely temporary inconvenience for the most part, some occurring in constitutions which gave evidence of the taint of scurvy contracted at Mooltan.

*Diseases of Lungs, &c.*—Diseases of the lungs, liver, and brain, numbering each 14, are the next groups in order. No fatal cases have occurred in any of these groups. Two cases of delirium tremens were treated; cases of this kind are too often seen here, and present the usual characteristics of the disease. It is subject of congratulation that a very great change is being effected in the management of this disease. In few instances has greater subjection,—unreasoning and abject,—of professional men been manifested, in yielding an unquestioning reverence to authority than in respect to this disease. The success in treatment so deplorably small would have justified any departure from established rules; yet they are still very commonly taught in books, and exemplified in practice. Better views however and better practice have been inaugurated. It is not recently that it has been taught that, "that peculiar form of mental derangement, to which we give the name of delirium tremens, is an effect produced on certain constitutions and in certain circumstances, by alcohol previously introduced, in frequent doses and at short intervals, into the blood."*

Yet though thus clearly recognised as the result of the action of poison, a result developed in a constitution debilitated by the effects of the poison, generally by want of food for long periods, often by want of sleep, the universal aim of the practice followed was, to cure by the exhibition of another poison, aided often by the continuance of the original source of the evil. Opium and brandy were called into requisition to cure a wretched sufferer whose state of disease had been produced by the use of brandy. It has been shown, however, that the disease does not arise on account of loss of accustomed stimulus, so that therefore brandy will neither prevent it nor alleviate its symptoms, and it has been proved that opium and brandy are not only not necessary but detrimental, and stand in the way when we wish to effect a cure. It has been proved that patients labouring under

* Alison's Contributions to Pathology.

this disease do well with kind treatment, food, baths, and that degree of control which may be necessary to keep the patient from causes of excitement, or soothe him when he becomes restless, alarmed, and loses self-possession. It is long since I saw some very touching and instructive cases ending fatally in which opium had been freely used. In one of them, after a long and apparently most hopeful sleep, the patient got up, drank some gruel, spoke sensibly, and died. Professor Laycock of Edinburgh, in the Edinburgh Medical Journal, No. 6, 1858, shows that patients get well without medicine, and fully supports the views I have held and which led me to abandon opium: other stimulants I never gave. It has been my practice, however, to give the diluted nitric acid and nitrate of potash, and it seems to me that the tongue sooner assumes the natural appearance,—thirst, if it exist, and it usually is not considerable, more speedily goes off,—and the appetite for food returns under the use of it more quickly than otherwise would be the case. Water poured on the head is frequently used with much advantage; and when the patient takes food, presents a clean tongue, and is free of excess of heat and thirst, though he be yet sleepless, it is not reason to doubt that he is doing well. Drugs to procure sleep are not wanted: and when it comes at last there is generally no recurrence of delirium, and the patient is soon perfectly recovered. It seems to me that in the cases given by the Professor, evidence enough and unexceptionable is given to support the adoption of a more rational treatment than what usually prevails; and if there be anything I would object to, it is that these cases seem to encourage too early a discharge from Hospital. When it becomes received as an established fact that death is the end of those cases only in which opium and stimulants are given, and that cases treated without recourse to these measures do well and recover, the inference that these measures are hurtful will be unavoidable, and the practice which has so long injuriously obtained must cease.

*Dropsies, &c.*—Dropsies, ophthalmia, and diseases of the skin form three small groups, but to one of them belongs one death. This was the case of a phthisical man, long the subject of chronic cough, diarrhœa, ascites, and lastly general dropsy. He was

sent to the depôt in the last stage of exhaustion, and died of diarrhœa.

*Syphilis.*—Syphilitic diseases formed a group of 15. This is not a large proportion out of 334 cases treated. I am one of those who believe, that "it has been perfectly established that "syphilis is cured in a shorter time, and with less probability "of inducing secondary syphilis by simple (non-mercurial) "treatment, than by the use of mercury."

*Other Diseases.*—The group of *all other diseases* embraced 42, and here also one fatal case occurred. This was a case of scrofula terminating in extensive ulceration of the neck and arms, and the man died from atrophy and diarrhœa. He was sent from Ghizree where he had long been a patient. The three fatal cases were all those of scrofulæ in men of middle age, and of services from seven to ten years. They differed only in the terminations, and organs and systems principally affected. Scurvy was a feature of this group. The disease, though it affects natives here, is rarely seen in Europeans. These men contracted it at Mooltan. This is a disease so plainly connected with the bad condition of the *ingesta*, that it has been thought enough in some cases to secure repose, good food, and good air in order to effect a cure. "Milk and the full diet of the Edinburgh Infirmary," says Dr. Bennett, "very frequently constituted the only treatment of individuals who recovered rapidly."* It has been also affirmed that with a few grains of potash added to the food of scorbutic patients recovery is secured. The statements are not inconsistent, nor are they repugnant to the use of lime-juice in scurvy. Potash belongs to all these substances, and to it, not to the acid of the lime juice as has been supposed, is the benefit to be attributed. Lime-juice has been commonly used in cases treated here, and in those of severity, potatoes have been given also. This is the best way perhaps of giving potash. Not every salt of potash is useful; little benefit in fact seems to arise when they are prescribed medically, and the chlorate of potash, for instance, recommended as a purifier of the blood, has been shown by Wöhler to pass undecomposed by the kidneys (*see Brande's Chemistry*). The cases usually get well in about one

* Principles and Practice of Medicine, p. 919.

or two months. Good water as well as good food and ample hospital accommodation are, in all cases, necessary for quick recovery: this seems to be more so in scurvy than in most other diseases.

*Women.*

The strength of the women was 66; and there were treated in hospital 44. Many others received advice and medicine, besides those treated in hospital, whose ailments were comparatively slight. The difference is very great between the condition as to sickness of the women and men. Of the latter, taking the average, every man must have been three times in hospital; but just about two thirds of the women were in hospital once. Hence, the ratio of sickness amongst the men was about five times greater than that among the women. There was one case of rubeola. There was one fatal case; this was in a consumptive woman, the mother of a young child which died. Her husband was absent, and she broke down with grief and chronic diarrhœa.

*Children.*

The calamity of the year was the condition of the children of the regiment, and that principally in regard to measles. The average strength of children was 94. The number treated in hospital 110; of these, 20 died. The proportion of sick to strength was 117 per cent, and of mortality to strength 21 per cent.; one half of this mortality was due to measles. 52 were attacked by this complaint, and 10 died: thus, 19 per cent. of those attacked sunk under the disease. Again, of the whole sick treated 77 were Europeans, of whom 38 were attacked with measles, and 10 died of that disease, and 6 of other complaints. The remaining sick were 33 Indo-Europeans, of whom 14 had measles, and none died; 4 died of other complaints. It is remarkable that in 52 Europeans, one in five died of measles, while of 14 Indo-Europeans there was no death. Again, setting aside the deaths in measles, 1 in 11,—9 per cent,—of the Europeans died; but with Indo-Europeans, 1 in 8 or 12½ per cent. On any principle, to explain the severity of the disease in the European children seems most difficult; especially since greater mortality in other complaints took place among the Indo-Europeans than

among them. And the exemption of the Indo-Europeans from death though 14 were attacked by measles is equally surprising. The mortality was greatest in those under three years of age, being one in three of those attacked; next in severity in those between three and nine years of age, of whom less than one in five died; and in those over nine years of age, of whom ten were attacked, none died.

Some years ago, measles appeared in this place, and went through the school, in which were about 80 pupils. One death only took place, and the cases I saw were well-marked but mild. Why the disease should have put on so virulent a character last year I know not. It was confined at the station almost entirely to the Fusiliers, but appeared amongst the children of the 7th Fusiliers, after they passed Kotree on their way up the river Indus. It began about the commencement of May, and went on till the end of June. It was thus coincident with the very hottest season of the year; and though this will not account for the outbreak, there is little doubt that the heat was less favourable than that experienced on occasion of the previous irruption of the disease, which took place in the earlier months of the year.

Many cases were simple and ran an easy course; and only when pungent ardent heat, with excessive florid eruption or dull colour, flaccid state of surface, bad development of eruption, and listlessness with persistent fever, were seen, was anxiety for the issue entertained. To these, some who lingered long and sank under the diarrhœa which followed and at times preceded the attack must be added, of whom from day to day it could not be said whether recovery was to take place or no, till at last, and perhaps suddenly, bad symptoms developed themselves. It could be said at first which cases were to prove mild, and which severe. The mildest did well with simple treatment; and I regret to say that when the excessive heat and pungency of skin gave notice of a bad case, whatever variety of means was resorted to seemed of very doubtful efficacy. If convulsions and excess of febrile heat demanded depletion, it might seem to meet the indication most urgent, but the want of vital energy would suffer the encroachment of the fatal issue notwithstanding. Most commendable was the anxiety and care

of the unfortunate mothers during this time of alarm and calamity. In one particular, however, their prejudices and the practice they followed in the care of their children it would have been well to have got rid of; but few could be persuaded that to cover up warmly in the great heat of May and June, their sick children, afflicted amongst other symptoms with frequent teazing cough, was otherwise than most proper and beneficial. This was often pointed out as erroneous and hurtful; but prejudice and affection were too strong for any arguments. I may notice, in connection with this, another prejudice often painfully obtruded on observation. A child will be brought in a far advanced stage of bowel complaint. It may seem, perhaps, that the time for successful treatment is passed, and when it is asked why the child was not sooner brought, the answer is that the child was teething or supposed to be teething, and that a loose state of the bowels was thought to be good for that process, and therefore looked on not with concern but favour. This prejudice ascends above the lowest rank, and is unfortunate and prejudicial. The theory that one disease should help the patient out of another is less likely to be correct than that both should conspire against him and by their united agency bear him down.

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*Annual Return of Sick of the Head Quarters, 1st European Regiment (Fusiliers), for the Year* 1858-59.

STRENGTH 487. *Mooltan, 1st April* 1859.

| | Treated. | Died. |
|---|---|---|
| Fevers | 825 | 3 |
| Diseases of the Lungs | 24 | .. |
| Diseases of the Liver | 24 | 1 |
| Diseases of the Stomach and Bowels | 88 | 2 |
| Epidemic Cholera | 2 | .. |
| Diseases of the Brain | 24 | 6 |
| Rheumatic Affections | 56 | .. |
| Venereal diseases | 90 | .. |
| Abscesses and Ulcers | 44 | .. |
| Wounds and Injuries | 37 | .. |
| Diseases of Eyes | 9 | .. |
| Other Diseases | 197 | .. |
| Total | 1420 | 12 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 291·5 |
| Ditto of deaths to ditto | 2·4 |
| Ditto of do. to treated | 0·8 |
| Daily average number of sick | 41·0 |

*Annual Return of Sick of the Left Wing, 1st European Regiment (Fusiliers), for the Year* 1858-59.

STRENGTH 385. *Umritsur, 1st April* 1859.

| | Treated. | Died. |
|---|---|---|
| Fevers | 172 | .. |
| Eruptive Fevers | 3 | .. |
| Diseases of the Lungs | 12 | .. |
| Diseases of the Liver | 13 | 2 |
| Diseases of the Stomach and Bowels | 58 | 7 |
| Diseases of the Brain | 22 | 1 |
| Dropsies | 1 | .. |
| Rheumatic Affections | 21 | .. |
| Venereal Diseases | 72 | .. |
| Abscesses and Ulcers | 17 | .. |
| Wounds and Injuries | 15 | .. |
| Diseases of Eyes | 4 | .. |
| ,, of the Skin | 1 | .. |
| Other Diseases | 23 | .. |
| Total | 434 | 10 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 112·7 |
| Ditto of deaths to ditto | 2·5 |
| Ditto of do. to treated | 2·3 |
| Daily average number of sick | 37·0 |

*Annual Return of Sick of the Depôt, 1st European Regiment (Fusiliers), for the Year* 1858-59.

STRENGTH 103. *Kurrachee, 1st April* 1859.

| | Treated. | Died. |
|---|---|---|
| Fevers | 108 | .. |
| Diseases of the Lungs | 14 | .. |
| Diseases of the Liver | 14 | .. |
| Diseases of the Stomach and Bowels | 44 | 1 |
| Diseases of the Brain | 14 | .. |
| Dropsies | 7 | 1 |
| Rheumatic Affections | 39 | .. |
| Venereal Diseases | 15 | .. |
| Abscesses and Ulcers | 15 | .. |
| Wounds and Injuries | 16 | .. |
| Diseases of Eyes | 5 | .. |
| ,, of the Skin | 1 | .. |
| Other Diseases | 42 | 1 |
| Total | 334 | 3 |

| | |
|---|---|
| Ratio per cent. of treated to strength | 324·2 |
| Ditto of deaths to ditto | 2·9 |
| Ditto of do. to treated | 0·8 |
| Daily average number of sick | 10·0 |

# SELECTIONS FROM CASES TREATED IN THE JAMSETJEE JEJEEBHOY HOSPITAL, BOMBAY.

BY J. PEET, M.D., Professor of Medicine, Grant Medical College.

Presented December 1859.

The following cases do not lay claim to consideration on account of their novelty. They are, for the most part, reports of diseases of almost daily occurrence. But as they may, perhaps, serve to illustrate points of interest in the treatment and diagnosis of these diseases it is thought that they may be usefully recorded.

(I.)—The first selection is of diseases of the chest. The prevalence of diseases of the chest amongst the native residents of Bombay has been fully established by Dr. Morehead in his paper in the Second Number of these Transactions (New Series). During the last year, there were treated in the clinical ward :—

| | | |
|---|---|---|
| Pneumonia ..... | 30 | cases. |
| Phthisis ..... | 10 | „ |
| Pleuritis ..... | 4 | „ |
| Bronchitis ..... | 14 | „ |

The cases of pneumonia met with in Bombay may be conveniently arranged in 3 classes.

1*st.*—*Sthenic cases*, in which, with well marked cough and dyspnœa, the sputa are more or less rusty colored,—the skin hot and pungent,—the pulse of good volume,—and the system but little reduced. This forms comparatively a small class.

2*nd.*—*Asthenic cases*, in which, from the first, the pulse is small and easily compressible, or has became so from the length of time the attack has lasted,—the skin of the extremities coldish, whilst that of the trunk is hot,—the cough and dyspnœa not very urgent,—and the sputa frequently untinged.

*3rd.—The 3rd class of cases* is by far the most numerous. It might perhaps be designated as *Intermediate.* The skin is hot and dry,—the cough and dyspnœa well marked,—the expectoration sometimes rusty,—the pulse small, and easily compressible.

To enter upon a critical discussion of the treatment of pneumonia would not be profitable. It may be sufficient to mention the following methods of treatment as those generally adopted at the present time.

1. The treatment by *Jugulation*, that is, by large and frequently repeated bleedings of which M. Bouillaud is the principal advocate.
2. The treatment by moderate blood-letting, either general or local, and the use of tartar emetic.
3. The treatment by stimulants even in the early stage.
4. The treatment by elimination.
5. The expectant treatment of the Vienna school.

Each of these methods has its followers ; but there is no doubt that of late years, the decidedly antiphlogistic doctrines have gradually lost ground. The first assault was made by the homœopathists, who have proved that there are cases of pneumonia, which do not require either blood-letting or depleting remedies. This was followed up by Dr. Todd, who has recorded facts to show that stimulation is in many cases even better than depletion. In spite of the opposition which innovation generally excites, the non-antiphlogistic doctrines have gradually made way. There is no denying the fact that patients do recover from pneumonia under stimulating treatment, or without any treatment at all, whilst on the other hand it is beyond dispute, that of the cases treated in the orthodox way,—by blood letting, &c.,—a considerable proportion die.

There is, therefore, a disposition practically to come to terms with the opponents of the antiphlogistic doctrines,—but there is a difficulty. To admit that they are right, is to acknowledge that the Gregorys, and the Cullens, and others, the modern Fathers of Physic, were wrong. In this dilemna, the happy thought has arisen of *a change of type in disease.* Either inflammation, it is said, or the system of those in whom it occurs, has of late years become so changed, that bleeding, which was

formerly absolutely requisite, is now unneccessary or even injurious.

No one seems to have called in question the truth of this dogma until Dr. Bennett gave his celebrated Introductory Lecture in the University of Edinburgh, in which he endeavoured to show that the change of practice was due, not to a change in the type of disease, but rather to our improved knowledge of physiology and pathology.

If Dr. Bennett had exhibited a want of faith in terrestrial attraction,—or had denied the influence of the heart in circulating the blood,—or had expressed his belief in the patriotism of Louis Napoleon,—he could not have excited greater sensation. He was assailed with weapons of every kind; some fairly and stoutly wielded, some thrust at random, and some poisoned by invective and scarcasm. I do not propose to take up time by dwelling upon this controversy, but this much I will say, that after going carefully through the arguments and facts adduced on both sides, I can see no evidence to satisfy my mind that there has been any change in the type of disease.

M. Bouilland *jugulates*, as he thinks, disease by large bleedings just as he did 20 years ago, and he finds no difference in the capability of his patients to bear such bleedings. We, in this country, treat cases of hepatitis and other inflammatory diseases, with one tenth less bleeding than did our predecessors in the early part of this century, and yet no one, I fancy, in this country, attributes this change of practice to a change in the type of disease.

Surely, as suggested by Dr. Bennett, if the human system has undergone such changes, that whereas formerly, when inflammation was present, blood-letting and other depleting measures were required, now they are hurtful, we should have some evidence of deterioration or weakness in the performance of the active duties of life. Soldiers and sailors and others would not be the men they formerly were.

There is one circumstance connected with this controversy which is worthy of remark, and that is the importance which appears to be attached to a particular line of treatment of pneumonia, as if this disease were always the same, no matter what

may be its stage or attendant circumstances. Great confusion has, I think, arisen in this as in many other discussions, from the premises not being clearly defined. One party, in using the the word "Pneumonia," have had in view a disease in which there is sympathetic inflammatory fever, with a full and even hard pulse ; another, a disease in which the fever is more of an irritative or typhoid character, the pulse being small and easily compressible. Both these diseases are called "Pneumonia." But it is obvious that there can be no profitable discussion upon them, unless each is separately defined. My own belief is, that moderate blood-letting is just as proper *now* in the treatment of sthenic cases of pneumonia as in the days of Gregory and Cullen. At the same time, there can be no doubt that more accurate diagnosis has brought to light a large number of cases in asthenic persons, which would have been formerly overlooked, and which are much better treated without depletion.

The following two cases will illustrate the symptoms and treatment of what may be called the sthenic form of pneumonia in Bombay :—

Case I.—*Pneumonia in the first stage on admission, passing afterwards into the second stage, occurring in a tolerably stout man, native of the Punjaub. Treated by local bleeding, calomel, and antimony.*

A. R., 35 years of age, a native of the Punjaub, but a resident for some years in Bombay, was admitted into the clinical ward of the J. J. Hospital on the 16 October 1854, suffering from cough, fever, and pain of the right side of the chest. He stated that five days before, he felt a severe shooting pain under the right nipple, which was soon followed by cough and fever ; the cough was at first dry, but in a few hours he had scanty expectoration which he observed to be red. The fever continued for three days without leaving him ; after that, it occurred at irregular periods.

On admission, the face was anxious, the skin hot and dry, pulse of moderate volume, soft, and 92 in a minute ; respiration 25. He complained of cough which kept him awake at night, and of pain in the right side of the chest which was increased by a deep inspiration, and by movement. There was scanty expectoration of opaque mucus, more or less adhesive. The right side of the chest moved defectively. From the spine of the scapula downwards and in the lateral region the percussion note was not clear, as compared with the opposite side. At the end of inspiration, a small crepitant rhonchus was audible. A little below the nipple (right) a friction sound was suspected.

Twenty-four leeches were applied to the right side of the chest, and half a grain of tartarized antimony given every three hours. The pain was at first somewhat relieved, but it soon returned, and the cough became more troublesome. Two days after admission, the right dorsal region was quite dull; crepitant rhonchus was only heard occasionally, and tubular breathing and increased vocal resonance were noticed. Three dozen leeches were applied,—three grains of calomel with a half a grain of tartarized antimony, the same quantity of ipecacuan, and two grains of hyoscyamus, were given every 3 hours. The pain was relieved by the leeches. He continued the pills till his mouth became tender. At that time no change had taken place in the physical signs, except the disappearance of the crepitus, but the cough was less, and there was no fever. The pills were omitted,—a blister was applied to the chest, and quinine with small doses of antimony given. He steadily improved, the cough gradually became less, and the expectoration more puriform. The dulness diminished, and crepitus redux was audible. He slept and ate well, and was discharged on the 29th,—13 days after admission.

*Remarks.*—This might, perhaps, have been more correctly called pleuro-pneumonia. The passage of the pneumonia from the first to the second stage was evidenced not only by the greater severity of the cough, but by the physical signs. No very decided change in the condition of the lung followed immediately upon the gums becoming tender, but from that time there was clearly no extension of the disease. No doubt the result would have been favorable if antimony had been alone given; but I think it is probable the lung would have continued longer in a state of consolidation. A large proportion of the cases similar to this have, indeed, been treated without mercury, and although, so far as regards the removal of the state of hepatization, the mercurial influence is serviceable, yet the danger of muco-enteritis, or the chance of a lengthened convalesence, is often a sufficiently valid reason for withholding it. Of the cases treated without mercury, there is no question that the consolidation of the lung is often slowly removed.

The following case will illustrate the effect of mercurial influence upon the lung, as well as some of its attendant disadvantages:—

CASE II.—*Pneumonia in the second stage, treated with calomel and antimony: dysenteric symptoms: long convalescence.*

A. G., aged 30; a robust looking man; labourer; native of Rutnagherree; resident for some months in Bombay; temperate, not abstinent;

was admitted into the clinical ward on the 12th January 1859. He stated that, seven days previously, he was attacked with fever, which was followed by cough and pain of the left side of the chest. The fever continued more or less throughout the 24 hours;—the cough was at first dry, but there was afterwards some white frothy expectoration. On admission, the skin was hot and pungent,—the pulse (120) of tolerable volume, though easily compressible,—the respirations 55 in a minute,—tongue thickly coated. He had frequent short cough with transparent mucous expectoration, which soon afterwards became rusty. He complained of pain in the left axilla, increased by pressure and cough, and a deep breath. The left side of the chest was dull behind, from the spine of the scapula to its lower margin. The breathing was tubular, and the voice preternaturally resonant. A subcrepitant rhonchus was heard below the angle of the scapula. The vocal thrill was more evident than on the opposite side: no friction sound was audible. Two dozen leeches were applied to the left side of the chest: he took two grains of calomel with a quarter of a grain of tartarized antimony, and the same quantity of opium, every four hours. The pain was relieved by the leeches but the cough rather increased, and the sputa became more rusty. The subcrepitant rhonchus was heard over a larger extent of surface, and even in the opposite dorsal region. The pulse rose to 132. The calomel was continued, and the dose of antimony and opium increased to half a grain. Four days after admission, the gums became tender. There was then no material change in the physical signs, but the febrile heat and cough were less, and the pulse reduced to 108:—the respirations were still 52. On the following day, the pulse was 99, the cough considerably less, and the respirations 42. He was, however, purged, and the stools gradually assumed a dysenteric character. The cough also became more troublesome, and the pulse rose to 100. Under the use of diaphoretics and opiates, the purging was slowly checked; but the pulse had lost so much in strength that stimulants of ammonia and wine were required. He very slowly improved. The dulness became less, the sub-crepitant rhonchus disappeared, and vesicular breathing became audible. He was discharged on the 12th February, one month after admission.

*Remarks.*—This is probably as sthenic a case of pneumonia as one often meets with in Bombay, and it is one of the few cases received into the clinical ward in which it was judged proper to give calomel. It is very doubtful how far this remedy was useful in hastening recovery. There certainly was great relief about the time the gums became tender, but this was followed by dysenteric symptoms, and a recurrence of the pneumonia. The former symptoms, occurring as they did at the time the gums became tender, should probably be attributed to the calomel.

The two following cases are examples of *asthenic* pneumonia :—

Case III.—*Pneumonia and bronchitis in a person of stout habit, treated at first with quinine, diaphoretics, and diuretics without benefit, afterwards with ammonia and wine with marked relief.*

A. H., a Persian horsekeeper; a stout looking man, of temperate habits, just arrived from the Cape of Good Hope; was admitted into the elinieal ward, 17th Deeember 1858. He was suffering from eough, dyspnœa, and febrile heat,—pulse small, frequent, and easily eompressible. He stated that, seven days before admission, he was seized with shivering, followed by heat of skin and eough. The ehest was broad and well formed,—respiration short and hurried ; all the front of the ehest was resonant, and there were loud sonorous and sibilant rhonehi. The right lateral and dorsal regions were quite dull,—a eoarse erepitant rhonehus, tubular breathing, and loud bronehial rhonchi were audible,—the voeal thrill was most marked on this side,—sonorous and sibilant rhonchi were general on the left side; quinine, in five-grain doses, was given, with ipeeaeuanha, wine, and diureties, and turpentine stupes were used to the ehest. The diet was milk, sago, and wine. On the 23rd, he was not improved. The pulse was 120, small, and very easily eompressible,—skin of body above, that of extremities below, the natural heat, and elammy,—lips dry,—tongue florid,—breathing greatly hurried ; he seemed drowsy. The wine was inereased to eight ounees, the milk to two pints, and he was ordered chicken broth. Five grains of earbonate of ammonia were given every second hour. On the following day, the pulse was redueed to 104, but the breathing continued as hurried. The medieine was continued and the mixture of quinine repeated. On the 27th, there is the following note—" skin now of natural temperature,—pulse 86,—tongue clean and moist,—dulness of back part of ehest,—and sonorous and sibilant rhonehi." The ammonia was omitted; he daily improved, and was discharged on the 3rd January, the following note having been made on that day—" skin cool,—pulse of natural volume and frequeney,—breath sounds natural,—respiratory murmur feeble behind,—very little dulness."

*Remarks.*—There was nothing in the general appearance of this patient to denote an asthenic state of the system. He had, however, just arrived from a sea voyage, and it is very probable had been badly fed on board ship. The extensive general bronchitis no doubt in some measure accounts for the extreme depression. The improvement of the pulse after stimulants were freely given was very marked.

Case IV.—*Pneumonia, of seven days' standing, of nearly the whole of right lung, treated with quinine, wine, and ammonia : rapid improvement and recovery.*

C. N., aged 24 ; a horsedealer ; Mussulman ; admitted into the clinical ward on the 29th December 1859. No account of his illness could be ob-

tained, further than that he had been ill seven days before admission, that the symptoms came on after he had been exposed to a cold wind, and that he was first attacked with cough and fever; he afterwards had difficulty of breathing, with pain in the front and right side of the chest. Some leeches were applied with much relief of the pain, but the cough and difficult breathing increased;—no other treatment was adopted. On admission his countenance was anxious and pinched,—the skin hot and dry,—pulse 140, soft, and easily compressible,—respiration chiefly abdominal, sixty in a minute,—tongue florid and glazed. He complained of pain in the right mammary and infra axillary regions increased by a deep inspiration and by pressure. He had much cough with rusty adhesive expectoration. The following were the physical signs;—"defective movement of the right side of chest,—dulness in all the regions below third rib in front, and inferior angle of scapula behind,—tubular breathing and increased resonance of voice,—above third rib in front, and in the interscapular region behind, crepitant rhonchus."

On the night of his admission, before being brought to the clinical ward, he took three grains of calomel and the same quantity of Dover's powder; afterwards he was ordered quinine in five-grain doses with chloric and nitric ether, wine and sago; turpentine stupes were used to the chest; he was put upon a diet of milk and chicken broth. On the morning of the 2nd (three days after admission) he was no better,—the pulse was 132, the respiration 58. The wine was increased to 8 ozs. in the 24 hours, and one drachm of compound spirit of ammonia was given with each dose of the mixture. On the following day, the pulse was reduced to 112, and the respiration to 50;—the medicine was continued. On the 4th, the pulse was 96, but very feeble; respiration 46; he appeared somewhat drowsy: five grains of carbonate of ammonia, an ounce and a half of wine, and the same quantity of camphor mixture, were taken every second hour, and wine and sago several times in the day and night. On the 6th, the pulse was still 96, and of better volume. In the dorsal region crepitant rhonchus was occasionally heard. The mixture was omitted, and quinine, chloric ether, and compound spirit of ammonia substituted. On the 8th, the pulse was 88, of fair volume; dulness much less, and crepitant rhonchus more general. Dilute nitric acid and bitter infusion were alone given. From this time the improvement was progressive, with the exception of a slight attack of pleuritis which was relieved by the application of a few leeches. On the 14th, he was discharged. The pulse was of good volume and of natural frequency; the dulness was very slight, vesicular breathing, with occasionally crepitus, were alone heard in the chest.

*Remarks.*—This and the preceding case are, I think, well-marked instances of the effect of stimulants. The pulse in this case, almost immediately after the ammonia was given, was reduced from 132 to 112. The indication was very evident. Not only were stimulants called for by the state of the pulse,

but also by that of the skin :—the extremities were coldish. I do not think, however, that even a hot and dry skin would be any contra-indication to the use of stimulants, if the pulse were rapid, small, and easily compressible.

The following case will illustrate the most common form of pneumonia, as seen in the Hospital.

CASE V.—*Pneumonia coming on during an attack of Tertian Fever, treated with quinine and diuretics.*

F., aged 16 ; from the neighbourhood of the Mozambique; was admitted into the clinical ward on the 14th August 1858. He was a stout looking youth. He complained of cough and of pain in the right side of the chest, which he said came on after a paroxysm of fever which attacked him eight days before, and which had subsequently recurred on alternate days. The skin was hot and dry,—pulse small and frequent and easily compressible,—respiration hurried and chiefly abdominal,—tongue coated in the centre, florid at the tip and edges,—bowels loose. He had cough with transparent mucous expectoration. There was dulness below the right axilla and scapula, where crepitant and occasional sonorous and sibilant rhonchi were audible.

He was ordered quinine in five-grain doses with acetate of potass, nitric ether, and ipecacuanha wine; five grains of Dover's powder were also given three times in the day ; a blister was applied to the right side of the chest. The febrile accessions were checked ; the cough became less; healthy vesicular respiration was heard in the lateral region four days afterwards. The quinine was omitted, and liquor potassæ with infusion of chreat substituted. He made a good recovery, and was discharged on the 2nd September. There was then slight dulness in the dorsal region.

*Remarks.*—In this class of cases where, as often happens, the pneumonia is secondary upon an attack of malarious fever, little more seems necessary than to check the febrile accessions. Upon the subsidence of the fever, the lung is gradually restored to a healthy state. At the same time, there can be little doubt that recovery is hastened by the use of suitable counter-irritants, and by combining diuretics or diaphoretics with the quinine. Where the disease is primary,—should the accompanying fever be of an intermittent or remittent character,—quinine in full doses is still useful. There is, I need scarcely say, in hospital practice, very great difficulty in distinguishing between primary pneumonia and that which is secondary upon fever. Dr. Morehead alludes to this at page 350 of the 2nd volume of his "Researches on Disease in India," and there states by what means a satisfactory diagnosis may generally be made. I have carefully followed his

directions, but, I must confess, with but little success. Still, if we act upon the principle that, whether the pneumonia be primary or not, if the attendant fever be of a remittent or intermittent type, quinine should be administered, the practical importance of making the diagnosis is not very great.

(II.)—There is probably no disease which has been more closely investigated during the last few years than that remarkable affection of the kidney which has been known by the name of its discoverer Dr. Bright. Dr. Bright recorded his cases in the year 1827, and it may with truth be said that no previous pathological discovery has attracted more immediate and general attention. Nevertheless, for a time, as might perhaps have been expected, the close investigation to which the disease was subjected, in place of simplifying and rendering its pathology more clear and distinct, had the opposite effect of obscuring it, by over minute distinctions and speculations. In truth, until the microscope was brought to bear in determining its nature, little progress would have been made from the circumstance that the disease affects the intimate or excreting structure of the organ.*

The earlier investigations brought to light the important fact that when the disease terminates fatally the kidney is not always in the same condition. Thus it was sometimes found larger and sometimes smaller than natural;—sometimes smooth on the surface, and at others covered with minute whitish looking granulations or with nodular eminences. Dr. Bright had, indeed, himself noticed three distinct varieties, but other observers extended the number to five, or even six.

These differences in the characters of the kidney naturally led to a very interesting inquiry, viz., whether they were to be viewed as so many separate diseases, or as different stages of one and the same malady?

* Notwithstanding the attention that was paid to the study of this disease in Europe, it attracted little or no notice as affecting the natives of this country until the year 1851, when it was brought before the Medical and Physical Society by Dr. Morehead. Dr. Morehead, as is well known, subsequently published the results of his more matured experience in the 1st number of its Transactions (New Series).

Upon the continent, the tendency seems to have been to recognise several distinct stages of the same disease, whilst in Great Britain, on the other hand, at least two varieties have been very generally distinguished, neither of which can be viewed as preceding or following the other.

Rayer describes six stages; Frerichs and Reinhart three, viz., the stage of hyperœmia, the stage of exudation or of fatty infiltration, and the stage of degeneration. In their view of the pathology, there is only *one* disease, the apparent varieties being merely stages, during which, the deposits undergo metamorphosis.

There can be no question that the stage of hyperœmia or congestion may pass into one of degeneration, in which the kidney becomes loaded with deposits, and from which restoration is impossible. In the first instance, doubtless, these deposits are of a fibrinous nature, but in the course of time, and sometimes very rapidly, they are transformed or they may degenerate, by a new arrangement of their ultimate elements, into fat. It is, therefore, certain that one variety of the large white kidney is to be viewed as an advanced stage of a disease which commenced as congestion or hyperœmia. But when we remember that the epithelial cells of the kidney, like the hepatic cells, contain, even in the healthy condition of the organ, a certain number of fat granules, it is easy to understand how by an increase of such granules, in consequence perhaps of some perversion of the nutritive process, a "fatty kidney" may result, which has not previously passed through a stage of congestion.

It was to this variety of fatty degeneration that Dr. George Johnson at one time proposed to restrict the designation "*Bright's disease.*" Frerichs on the other hand doubts whether it ever exists; he would view all fatty states of the kidney as the result of fibrinous metamorphosis. No doubt it is difficult, even for the best microscopical observers, to determine, when the kidney is in a state of fatty degeneration, whether the deposit is the result of a process of secretion or of metamorphosis; but I think the analogy of the liver, in which fat is unquestionably secreted, should lead us to recognise a form of "fatty kidney" as described

by Dr. Johnson; at the same time, no one, not even Dr. Johnson himself, would now attempt to restrict Bright's disease to this form of degeneration.

But the point most debated is in regard to the small or atrophied kidney. Is this to be viewed as the advanced stage of the large white kidney, or is it a disease *sui generis?* Frerichs and others have viewed it in the former light. It is said that the deposits within the uriniferous tubes of the large white kidney are washed out, that the epithelial cells lining the tubes separate, and that the tubes collapse. The deposits in the intertubular structure, or matrix, having undergone a process of contraction, the size of the organ is diminished, and the surface rendered irregular just as happens in cirrhosis of the liver. The anatomical changes just noticed, I shall presently examine; in the meantime it may be asked upon what proof does the assertion of the *oneness* of these forms of disease rest? For my own part, I find not only no proof but very little evidence. Against the identity of the diseases the following considerations may be urged:—

1*st.*—The large white kidney is almost invariably accompanied by dropsy, and a fatal result has, perhaps, never been seen without its previous occurrence, whereas the small contracted kidney sometimes proceeds to the extreme degree of degeneration, and to even a fatal termination without dropsy having been once present.

2*nd*—No one has been able to discover that the atrophied kidney had ever been in a condition resembling the large white kidney; that is to say,—that it had ever had its tubes generally blocked up by granular or fatty deposit, or that it had been preceded by a stage of hyperœmia.

We are therefore, I think, bound to admit that this is a disease "*sui generis*," and that it is as distinct from the large white kidney as pneumonia is from phthisis.

The anatomical characters of the small contracted kidney are deserving of a passing notice. Besides being of small size its surface is either granular or nodular, its density increased, and its cortical part almost entirely destroyed, the pyramids reaching nearly to the surface. Many tubes are collapsed,

or even obliterated, some are filled with granular débris and oil globules. Of epithelial cells there is scarcely a trace; a few of the tubuli, however, are sometimes seen empty, having the basement membrane denuded of its epithelial lining. The so-called hob-nail kidney I do not particularly notice: it is supposed to bear a close resemblance to cirrhosis of the liver, and to be the result of a fibrous deposit in the matrix, just as cirrhosis arises from a similar deposit in Glisson's capsule. The best observers have, I believe, been unable to satisfy themselves of the existence of any fibrous arrangement in such cases, and it is doubtful whether there is a matrix in the kidney which can be at all compared to Glisson's capsule.

Confining myself, for the moment, to the view of Bright's disease being, when fully established, essentially degenerative, we have two varieties. 1st, that in which the kidney is large: 2nd, that in which it is small. The question now arises,—Is either or are both of these forms preceded by a stage of hyperœmia? and is such stage of hyperœmia (should there be one) a necessary and constant antecedent? In the present state of our knowledge this question cannot be completely answered. In a large proportion of cases no evidence can be obtained of the occurrence of acute symptoms, the disease having been insidious in its commencement, and in its progress; still it is quite conceivable that a short stage of hyperœmia may have passed away, without symptoms sufficiently severe to attract the patient's notice. But whilst our knowledge is too imperfect to enable us to say that this condition is always, or even generally, present, we have abundant proof, that it is so in a certain proportion of cases. Perhaps no better illustration of this fact could be given than cases of "Bright's disease" following scarlet fever, of which the following is condensed from Dr. Basham's Work, page 63:—J. H., aged 6; admitted December 28th, 1857. He was the subject of general anasarca fourteen days after the disappearance of a trifling and imperfect scarlatinal rash. The face was puffed and the eyelids œdematous, and the serous infiltration extended to the back of the hands. The urine was highly albuminous and threw down a flocculent reddish coloured deposit, which, under the microscope, was found to consist of casts containing blood discs, and epithelial

cells. There were also many of the larger polygonal cells of the straight tubes held together by granular exudation, and many free blood corpuscules. The treatment was by purgatives, antimonials, and warm baths, but without benefit. On the 7th January the urine presented the same albuminous condition, but the microscopic appearance was greatly altered. Scarcely a blood disc was visible, the casts were entirely free from them. There were fibrous cylinders of a fine granular appearance; there were others which contained numerous resplendent granules, evidently free nuclei. Some abortive epithelial and free fat cells were also present. The dropsical symptoms increased, and the child died from pulmonary œdema on the 9th January.*

I have extracted this case from Dr. Basham's work, because as scarlet fever is not known in this country we have no opportunity of studying it as a cause of Bright's disease. There is, however, a condition of the kidney occasioned by exposure to cold, which does not appear to differ essentially from that following scarlet fever, and of which we here meet with numerous examples. I beg to refer to Dr. Morehead's Cases Nos. 346, 352, 353, 378, 394. The history of these cases is usually as follows :—

A person in his usual health, after being exposed to cold, is attacked with chills, followed by febrile heat and dropsical swelling; the urine is scanty or altogether suppressed; it is of a dark brown colour (smoky), above the average specific gravity, and it becomes nearly solid on the application of heat. On standing, it throws down a reddish looking sediment, which, under the microscope, exhibits fibrinous casts entangling blood discs, and well formed spheroidal epithelial cells.

The disease being thus established, one of four things may happen :—

1*st*. The patient may die in a few hours under symptoms of coma.

2*nd*. He may completely recover.

3*rd*. The dropsy increasing, he may die in a few weeks, or at the end of many months.

* For *post-mortem* appearances, see Dr. Basham's work on Dropsy connected with Disease of the Kidneys, p. 69.

4*th*. He may partially recover, the dropsical symptoms may be relieved, but a state of ill health remains followed by a recurrence of dropsical symptoms which ultimately prove fatal.

It being then unquestionable that there is a stage of congestion from which recovery may, or may not take place, we may next inquire as to the means at our disposal for estimating the probability of one or other of these results. As regards recovery, there is not in general much difficulty; the disappearance of the dropsical symptoms, and of the albumen from the urine, the restoration of its natural colour, quantity, and density, are usually sufficient. But there are cases which are not so easily determined, cases in which there may be great relief of urgent symptoms, at the same time that disorganization has already commenced in the kidney, and in which a general examination would lead to error. The first attempt to estimate the progress of Bright's disease was made by ascertaining the amount of the solid constituents in a given quantity of urine, calculating from this the total amount excreted in 24 hours. This method of examination was open to great fallacy, because the amount of solid excretion varies, as is well known, during almost every hour of the day. The only accurate estimate could be formed by taking a specimen from the whole of the urine passed in the 24 hours, but it is difficult, almost practically impossible, to get sick people to collect all the urine that is passed, and the loss of even a small quantity would vitiate the result. The method adopted in determining the amount of the solid constituents of the urine was equally fallacious. It consisted in taking the specific gravity by a rough sort of contrivance called an urino-meter, and then calculating, by the use of tables prepared for the purpose, the amount of solid matter present in a given quantity. This being multiplied by the total quantity passed in 24 hours, gave the total daily solid excretion.

Lehmann, in his "Physiological Chemistry," has shown that "there does not exist any definite proportion between the salts in the urine and its density, and much less that any such connection exists between organic matter and the density of the fluid."

I am not, indeed, at all sure that the normal quantity of urea excreted by healthy persons in Europe has been accurately ascertained. Dr. Golding Bird estimates the quantity of urea excreted in 24 hours at 270 grains ; Lehmann and others have found it, from the mean of a number of carefully conducted observations, to amount to nearly 500 grains.

In the 55th No. of the Dublin Quarterly Journal, there is a very able paper upon the chemistry of the urine, in which some original observations upon the normal excretion of urea are recorded ;—the results accord very closely with Lehmann's investigations. In this country, I need scarcely say, the chemistry of the urine requires a separate study. Neither can any trustworthy inferences be drawn from the amount of albumen, for, in the first place, the same practical difficulties, which were stated to interfere with the estimation of the amount of the ordinary solid constituents, are equally applicable to it, whilst the amount actually present bears no relation to the severity of the disease. This mode of examination being then avowedly insufficient, we may next inquire whether any other kind of examination can be substituted. The answer to this is sufficiently simple;—we possess in the microscope an instrument which bears something the same relation to diseases of the kidney, that the stethescope does to diseases of the lungs and heart. By a microscopic examination of the urine, there is no doubt the nature and progress of the disease can often be very accurately determined. It is now quite certain that at least three conditions of the kidney can be ascertained by a microscopic examination of the urine ;—

1*st.* The large red or congested kidney.
2*nd.* The large white kidney.
3*rd.* The small or atrophied kidney.

I will briefly state the distinctive characters of the urine in each, though they have been already incidentally noticed.

1. *Large red kidney.*—Urine scanty, of a dark brown colour, acid, S. G. 1,015 to 1,025, becoming nearly solid on the application of heat, throwing down a reddish sediment which consists of fibrinous casts, entangling blood discs and epithelial cells.

2. *Large white kidney.*—Urine but little less than the natural quantity, pale, specific gravity below the normal standard, highly albuminous, containing granular casts, abortive epithelial cells, compound granule cells, free nuclei, sometimes grouped.

3. *Small atrophied kidney.*—Urine of natural or above the natural quantity, of a pale straw colour, of low specific gravity, sometimes, not always, becoming turbid on the application of heat: deposits a sediment which, under the microscope, exhibits compound granule cells, granular matter, and occasionally transparent casts, fat granules, and granular cells.

But not only are we able to ascertain the presence of these three forms of disease, but we can (which is of more importance), by watching the changes which take place in the urine, note the first appearance of degenerative disease. The disappearance of blood discs, the increase of fat cells, the diminution in the number of true epithelial cells, the gradual appearance of compound granule cells and of free nuclei, mark the transition from the stage of congestion or hyperœmia to that of degeneration.

The following case will perhaps serve to render this more clear:—

Case VI.—*Bright's Disease (acute), at first cylindrical casts entangling epithelial cells and blood globules, afterwards compound granule cells, and free nuclei, and oil globules.*

L. J., age 25; banian; shopkeeper; native of Rajapore; resident in Bombay for 5 years; admitted into the clinical ward 25th August 1859. The face was puffy, and the lower lids much distended,—the abdomen swollen, tympanitic in front, dull at the sides,—the feet œdematous,—the skin of natural heat,—pulse but little above natural frequency, soft, and easily compressible; he complained of pain in the loins. The urine was scanty (eight ounces only being passed in the night); it was of a bright red colour, became almost solid upon the application of heat, and threw down a sediment after standing for a few minutes. The sediment, under the microscope, was found to consist of cylindrical casts, slightly granular, containing blood globules, and spheroidal epithelial cells,—in a few of the latter there were oil globules. His history was as follows:—Two months before, he suffered from intermittent fever followed by jaundice, of these he soon got well. Fifteen days before admission, he first observed the puffiness of the face. He was dry cupped on the loins, and was freely purged with jalap and bitartrate of potass; Dover's powders, and subsequently antimony, were given. The purgative was occasionally repeated and diuretics were administered. The swellings gradually subsided, when he was put upon a course of the tincture of the sesquichloride of iron. The urine became more abundant, but continued highly coloured. It

was often examined under the microscope. At each examination there appeared to be an increase in the oil globules; not only were they seen in the cells entangled in the cylindrical casts, but also in detached cells, which were scattered over the field of the microscope. At the last examination, a few days before his discharge, numerous compound granule cells were observed, and free nuclei collected into groups. He left the hospital on the 10th October; he was free from dropsical symptoms, but the urine was still highly albuminous.

*Remarks.*—This case illustrates well the use of the microscope in determining the condition of the kidney. When admitted, there was probably little more than a state of congestion from which complete recovery was quite possible. The few oil globules present were confined to the cells entangled in the cylindrical casts. They afterwards, however, became more numerous, and were seen not only in the epithelial cells entangled in the casts, but in others scattered over the field of the microscope. Latterly compound granule cells were seen, and even free nuclei. These appearances denote that the disease is no longer merely congestive. This patient I have seen several times since his discharge: he continues free from dropsy, but is weak and unfit for exertion. This case contrasts strongly with another case which was under treatment about the same time—the particulars of which I will briefly relate:—

Case VII.—B. R., aged 24; Hindoo; coachman; native of the Concan; of intemperate habits. Was admitted into the clinical ward on the 21st June 1859. He stated that three months before, whilst at Nassick, he suffered from daily attacks of fever. He came to Bombay, after which the fever left him, but his face and abdomen began to swell. He was admitted into hospital, and cured, to appearance, of the dropsy. A month, however, before his admission into the clinical ward, he returned, and the face, abdomen, and lower limbs, became enormously swollen; the urine was of about the natural quantity, of specific gravity 1,012, and highly albuminous; the swelling of the face and limbs was very great. He suffered much from distension and dyspnœa. By the use of elaterium, gamboge, and jalap, the swellings were much reduced. Fourteen days after his admission, the urine was carefully examined; it was about three pints in the 24 hours, of a pale straw colour, highly albuminous, throwing down a pale floeculent sediment after standing for a few hours. This, under the microscope, exhibited large well-defined casts, charged with oil globules, also numerous oval shaped cells detached, and filled with oil globules. On shaking a portion of the turbid urine with ether it became nearly clear. He remained in hospital for many weeks, the dropsy

being kept under by cholagogue cathartics:—diuretics were useless. No change took place in the urine, except that it became more copious,—as much as five pints being sometimes passed in the 24 hours. He was discharged at his own wish, as he considered himself fit to follow his employment, that of a horsekeeper.

*Remarks.*—We have no evidence in this case of any antecedent stage of congestion. This, together with the great abundance of fat granules and of large cells charged with them, render it very probable that the kidney has undergone fatty degeneration, in a sense similar to that in which we speak of a fatty liver.

But it is not only in determining the onward progress of the disease that the microscope is of service, it has enabled a favourable prognosis to be made in cases where, without it, from the severity of the symptoms, the most serious results might have been anticipated.

Dr. Johnson relates the case of a woman admitted with the following symptoms. She was in a state of half stupor, having been seized with a convulsive fit in the course of the preceding night. She had a wild distracted look, and a brown dry tongue. Some urine was obtained, and it was found to contain epithelial casts with scattered epithelium: it became almost solid on applying heat. From this appearance of the urine, great light was thrown upon the nature of the disease; and Dr. Johnson was enabled to hold out hopes of the patient's recovery;—his hopes were realised. By cupping on the loins and the use of purgatives, she was relieved, and ultimately quite recovered.

There can therefore be no question of the great value of the microscope; at the same time its employment should not interfere with other modes of examining the urine. The density and re-action should be always ascertained. In regard to the density of the urine, we have here to contend with a difficulty which is not felt in Europe. We are not as yet acquainted with the normal density of the urine in the natives of this country; it is probable that it will be found somewhat less than in temperate climates, in proportion to the quantity of fluid taken.

By a reference to observations recorded in the 55th No. of the Dublin Quarterly Journal, it appears (from the mean of 6 observations) that the specific gravity of the urine of persons living

on animal food was 1021·7,—of persons living upon vegetable, 1014·0.

Observations lately made by myself gave the following results:—

(1) 13 daily observations upon a European:—

| | | |
|---|---|---|
| Largest quantity of urine in 24 hours | .. | 40 oz. |
| Smallest Ditto | .. | 22½ „ |
| Mean Ditto | .. | 32 „ |

(2) 15 daily observations upon Parsees:—

| | | |
|---|---|---|
| Largest quantity | ..... | 42 „ |
| Smallest Ditto | ..... | 21 „ |
| Mean Ditto | ..... | 30 „ |

(3) 34 daily observations upon Hindoos:—

| | | |
|---|---|---|
| Largest quantity | ..... | 57 „ |
| Smallest Ditto | ..... | 12½ „ |
| Mean Ditto | ..... | 31 „ |

The average quantity of urine passed in 24 hours, would thus appear to be somewhat less than in Europe, but observations require to be greatly extended; and they are here chiefly noticed with the view of directing attention to the subject.

In regard to the density of the urine in healthy people in this country, we do not possess, so far as I know, any information beyond that contributed by Mr. Carvalho in the 2nd No. of the New Series of the Transactions, p. 285.

I have lately made a few observations upon this subject, the result of which I will shortly state:—

| | | | | | S. G. |
|---|---|---|---|---|---|
| 19 | observations on a | European gave as the | Highest specific gravity | .. | 1,032 |
| | | | Lowest „ | .... | 1,014 |
| 14 | daily | Ditto | Highest „ | .... | 1,029 |
| | | | Lowest „ | .... | 1,017 |
| | | | Mean „ | .... | 1,025 |
| 8 | Ditto | Parsees | Highest „ | .... | 1,026 |
| | | | Lowest „ | .... | 1,017 |
| | | | Mean „ | .... | 1,023 |

| | | | S. G. |
|---|---|---|---|
| 69 observations in Hindoos, Highest | „ | .... | 1,029 |
| Lowest | „ | .... | 1,008 |
| Mean | „ | .... | 1,016 |

I hope, hereafter, to submit a paper on this subject to the Society.

But it would not be well to be satisfied with the microscopic, or, indeed, with any other kind of examination of the urine. It is by trusting exclusively to the stethescope and microscope in the diagnosis of certain diseases that a handle has sometimes been given (for what have been misnamed practical men) to disparage the use of these instruments.

In Bright's disease, it is well known that the dropsy generally begins in the face:—Dr. Barlow has drawn attention to a watery state of the conjunctivæ as one of the earliest symptoms. Fluid is effused beneath or into that membrane. The distension or bagging of the lower lid is often very remarkable at an early period of the disease. In most cases, it will be found that the swelling of the face is out of proportion to the dropsy of other parts.

But dropsy is by no means always present. In the small atrophied kidney, it is more frequently absent than present. Here we must expect derangement of the nervous system, such as convulsive attacks, drowsiness, and coma.

There can, I think, be little doubt that, in this country, cases of supposed remittent fever, terminating suddenly under head symptoms, are sometimes cases of Bright's disease. Under proper treatment, there would be a fair prospect of recovery in such cases, but if treated for remittent fever, they would, I suppose, be invariably fatal. A symptom to which importance has been lately attached, is the inodorous condition of the urine. It is said that in Bright's disease, the kidney does not excrete odorous substances,* but probably this statement requires confirmation. M. Trousseau has remarked that any sudden increase of presbyopia should excite the suspicion of Bright's disease or diabetes.†

* Lancet, 1858, vol. ii. p. 503.
† Med. Gazette, 1856, vol. ii., p. 427.

The pre-disposing cause of Bright's disease is no doubt the same in this as in other countries, viz. a more or less cachectic state of the system. In European countries this is often the result of the habitual use in excess of alcoholic liquors. This cause is not wanting here, but there is another also in existence, viz. opium eating. It remains, however, for future investigation to determine whether there is the same connection between "Bright's disease" and "opium eating," as between it and spirit drinking.

It will also be an interesting inquiry to determine the relation of "malaria" to Bright's disease. Dr. Morehead's cases* seem to show the frequent co-existence of this disease and malarious fever, and my own clinical cases establish the same fact; but much careful investigation is necessary before this can be viewed as anything more than coincidental.

But whilst we have in this country in malaria a cause of cachexia, which may possibly be operative in producing "Bright's disease," one undoubted and very common cause in other countries is altogether wanting, viz. "*Scarlet Fever.*" The evidence to show that the congestion of the kidney, which follows exposure to cold after an attack of scarlet fever, often lays the foundation of degenerative disease, is to my mind quite conclusive. Scarlet fever is not known on this side, nor, indeed, in any part of India. Epidemics have been described, which have been thought to exhibit the symptoms of this disease in a somewhat modified form;—that is to say, a fever has occurred with a scarlet rash and swelling of the throat. But in the proved absence of contagion, the extremely small mortality, the irregularity in the appearance and disappearance of the eruption, the non-occurrence of the ordinary sequelæ of scarlet fever, and other peculiarities which might be mentioned, we have abundant evidence of a distinct affection. The epidemic to which I have referred, I may remark *en passant*, has prevailed in various parts of India since the early part of the present century. † In the year 1824 it overran nearly the whole of the Lower Provinces of Bengal, having commenced in Burmah. It afterwards stretched

* Clinical Researches.

† Transactions of the Medical and Physical Society of Calcutta, No. 1.

across to Guzerat. In the present year, an epidemic of a similar disease prevailed to a slight extent amongst Europeans in Bombay and Poona. This fever seems now to be indentified with the Dengue or Breahbone or Dandy Fever of the West Indies.*

The peculiar relation of scarlet fever to Bright's disease has been, and is, the subject of much discussion. Is the latter the result of the separation, or attempted separation, by the cells of the kidney, of the poison or the *materies morbi* of the former disease? or, is it simply caused by determination of blood, the secretion from the skin being suddenly suppressed? These are important and interesting questions, but they are much better discussed in those countries where scarlet fever is common than in this, where, as I have said, it is not known. We have so large a field open to us in regard to the tropical relations of disease, that it is neither judicious nor prudent to occupy ourselves with discussions upon questions which can be better examined in other countries.

A very interesting subject of inquiry is the immediate cause of death in those cases which are fatal under head symptoms. Does it arise from the accumulation of urea in the blood? At one time, this question would have been answered emphatically in the affirmative; but, from experiments which have been made within the last few years, it seems doubtful whether urea circulating in the blood is so poisonous as has been supposed.

Frerichs supposes that it is only poisonous after it has undergone decomposition and been converted into carbonate of ammonia. This subject is ably discussed by Dr. Morehead in his 2nd volume, but more particularly with reference to the chronic form of the disease. Whilst admitting that urea may exist in the blood, he does so in a very qualified degree, for, as he justly observes, "when an important organ becomes gradually unfit for function, then the actions of the system are gradually toned down to harmonize with this defect. The lungs, gradually unfitted by tubercular deposit, or the liver by cirrhosis, do not lead to excess of carbonic acid or of bile in the blood, but to an anemic state of the general system. The blood is gradually brought down to that quantity which these imperfect organs are able to depurate.

* Wood's Practice of Medicine. Aikin's Hand-book.

For a similar reason, when the kidney becomes disabled by degrees, it follows that there will be defect of urea in the urine, but by no means necessarily excess of this excretion in the blood. On the contrary, the inference from analogy is, not that there will be excess of urea in the blood, but that the blood will be brought down to the quantity which the kidney is competent to purify."

There is great force in this reasoning, but at the same time, when we remember how rapidly head symptoms are developed in well-established cases of Bright's disease, from a very slight diminution in the secretion of urine, consequent upon exposure to cold or some error in diet, it seems certain that they must be due to the retention in the blood of something which should have been excreted by the kidney. It is not necessary that we should attribute them to the retention of urea alone, nor, indeed, of any other of the constituents of the urine; it is much more probable, that they are due to the conjoint influence of all.

*Treatment.*—The first question which must be decided in regard to treatment is, whether diuretics should or should not be given. Upon this point there has been much discussion. No doubt, reason is to some extent opposed to their use. For what, it may be said, can be the use of sending a large quantity of blood to the kidney, when its structure is destroyed? It would be as reasonable to try to make a horse gallop when both its hind legs are broken. If we were quite certain that the whole of the secreting structure of the kidney had been destroyed, this reasoning would have great weight, but we can never be sure of this; on the contrary, there is, in most cases at least, a part of the secreting structure of the kidney which is not destroyed.

It may, however, be said, that the effect of the action of diuretics upon the weakened and partially destroyed portion of the organ is injurious, and, consequently, that by their use the progress of the disease is hastened. I am not prepared to undervalue the force of this objection. It must, however, be borne in mind, that, in having recourse to diuretics, we have to select what appears to be the least of two evils. It may be that they are hurtful to the kidney in spurring it on to do more than it is well capable of performing, but, at the same time, the continuance

of the dropsy, for the relief of which they are given, might cause death by pulmonary œdema, or some other effusion.

There, are, however, two conditions of the kidney, in which, as a general rule, diuretics should not be given, viz. the large red and the small atrophied kidney. To give diuretics, when the scanty secretion of urine is due to over-distension of the vessels of the kidney, is clearly not a rational mode of treatment, and to administer them in cases of atrophied kidney, is unnecessary, by reason of the absence of dropsy, and of the secretion of urine in such cases being for the most part copious.

In the treatment of the acute form, the skin and intestinal canal are the emunctories which should be acted upon; cupping on the loins, the warm water or hot air bath, warm clothing, diaphoretics, and cholagogue purgatives constitute the proper line of treatment. But supposing these measures to have been adopted, and as we may reasonably infer the congestion to have been in some measure removed, are diuretics then to be given? There is no question, that, when they are given at this period, the secretion of urine is augmented; but it is doubtful whether this is a case of "*propter hoc.*" The same increase in the quantity of urine occurs in cases where no diuretics have been used, and it has been attributed to the diuretic action of the urea which, having accumulated in the blood, is now rapidly excreted. The rule of practice seems to me sufficiently clear in these cases;—to give diuretics only after all other means have been found insufficient.

In the treatment of those cases in which the kidney is atrophied, diuretics are not in general required. Should there be dropsy, purgatives will probably be more useful. It sometimes however, happens, that the bowels are relaxed, and yet the dropsy increases. In such cases, having failed in effecting much good through the skin, we must, as a last resource, have recourse to diuretics. Diuretics are therefore chiefly to be employed in those cases of dropsy where the kidney is enlarged but not congested. We must not, however, here be very sanguine as to their effects. They will frequently fail, as they did in each of the cases which have been related in this paper. Much more benefit will in general be derived from the judicious use of purgatives

combined with tonics, and particularly the preparations of iron, of which the tincture of the sesquichloride is probably the most efficacious. It is surprising how well even weak people bear purging when dropsy is present.

(III). The following case relates to a subject of considerable interest, upon the pathology of which some difference of opinion still exists, viz: "Emphysema of the Lungs." Noticed by Floyer in 1698,—described (anatomically) by Dr. Baillie and others,—the rationale of its production was first pointed out by Laennec, whose views were very generally adopted until called in question by Sibson, Williams, and still more recently by Gairdner.* Laennec's theory, as is well known, was that a bronchial tube being obstructed by mucous, the cells behind became dilated during expiration. There are undoubtedly strong theoretical objections to this explanation, but they are cast in the shade, by the discovery of the fact that, when a bronchial tube is obstructed, the portion of lung to which it leads does not become filled, but on the contrary emptied of air,—or in other words, the obstruction of a bronchial tube leads to collapse of the lobule or lobules with which it is connected. The expiratory doctrine of emphysema, therefore, seems untenable; at the same time there is no question that the observation of Laennec as to the frequent dependence of emphysema upon bronchitis is correct. Dr. Gairdner's theory is essentially inspiratory. He conceives that a portion of the lung being atrophied (*i. e.*, by pulmonary collapse, or in connection with tubercle, &c.), the air cells of the other portions become dilated during inspiration by atmospheric pressure. There can be no difficulty in assenting to this part of Dr. Gairdner's doctrine; but he goes further than this, and maintains that the pressure upon every part of the lung being equal, it is impossible, upon mechanical principles, without diminution of bulk of some part of the lung, that the air cells can be distended.†

* British and Foreign Medical Chirurgical Review, No. XI.

† Dr. Gairdner's views, reduced to aphorisms, are as follows:—

1*st*. That emphysema is a lesion of mechanical origin.

2*nd*. That it is produced by the inspirating force and never during expiration.

3*rd*. That it is due *solely and exclusively* to the action of that force upon the previously sound air vesicles in lungs which have undergone, in other portions, atrophy or collapse.

Now I think it must be admitted that emphysema is sometimes present, when it is quite impossible to discover diminution of bulk in any portion of the lung, as, for example, in some cases of croup and hooping cough, and it is consequently not easy to assent to the whole of Dr. Gairdner's proposition. Dr. Jenner denies the inspiratory doctrine altogether, and maintains "that the force called into play by powerful expiratory effort, is by far the most common and efficient cause of emphysema. He questions the soundness of the arguments founded upon the physical condition of the lungs in relation to their containing cavity, and maintains that the pressure during respiration is by no means equal upon every part of these organs.*

CASE VIII.—*Remittent Fever with General Bronchitis and Vesicular Emphysema. Became convalescent, but was suddenly seized with great dyspnœa and collapse, and sank in 3 days. General emphysema and dilatation of right side of heart, with vascularity and thickening of lining membrane of bronchial tubes to their minute ramifications, the only abnormal appearances after death.*

J., age 40; servant; native of Kundool; resident in Bombay for 12 years; Hindoo; of intemperate habits; admitted into clinical ward, 18th July 1854.

He stated that, without any apparent cause, 6 days before admission, he was seized with an accession of fever, pain of the chest, and cough; the latter were persistent, but the fever left him in a few hours with slight sweating. It, however, recurred daily between 2 and 3 o'clock in the afternoon, and continued for about 4 or 5 hours. On coming into the hospital, the following note of his symptoms and the physical signs was made:—"Is reduced,—countenance anxious,—skin above natural temperature,—pulse small, easily compressible and frequent,—respiration hurried and short,—tongue thinly furred and slightly florid at tip,—sleeps badly at night,—has headache and cough, with frothy mucous expectoration, streaked, *not mixed*, with blood,—complains of pains of central part of chest on coughing or on deep inspiration,—appetite impaired,—vomiting after meals,—bowels free,—urine scanty and highly coloured." *Physical signs.*—Subcrepitus mixing with respiratory murmur, in regions of right side; in left, large crepitation with sibilant râle; no dulness. He was treated with quinine and expectorants during the remissions, with marked benefit; the febrile exacerbations were checked, and the breathing became easy. He continued tolerably well until the evening of the 29th, when he had an accession of fever; this recurred for several nights, but was checked by large doses of quinine. On the 11th August he had slight dysentric symptoms, for which ipecacuanha, blue pill, and gentian were given, and warm turpentine applied with relief. On the night of the 12th there was a recurrence of fever

* Medico-Chirurgical Transactions, 1857.

with a good deal of dyspnœa; the latter was somewhat relieved by an ipecacuan emetic, and the fever subsided early in the morning. Towards evening the dyspnœa returned, and the respiration became laborious. From the morning of the 14th, there was no relief of his symptoms, the pulse fell, and the skin became cold and clammy. He died on the 16th.

*Inspection* 19 *hours after death. Chest.*—Old adhesions of the pleura on the right side; both lungs emphysematous; they did not collapse on opening chest; numerous large vesicles were seen beneath the pulmonary layer of pleura. On a section there was an almost entire absence of fluid. The lining membrane of bronchial tubes down to their minute ramifications highly vascular and thickened;—the tubes contained muco-puriform fluid. *Heart.*—Small, the right side distended and filled with fibrinous clots, left side empty: other viscera healthy.

(IV.) The following case illustrates the rapid progress of inflammation to a fatal termination, when occurring in connection with Bright's disease:—

Case IX.—*Pleuro-pneumonia with pericarditis: symptoms rapid in their progress: Bright's disease of the kidneys.*

D. K., aged 28; Portuguese cook; of temperate habits; native of Goa; admitted into the clinical ward November 2nd, 1858. He stated that 9 days previously, after bathing in cold water, he had an attack of shivering which was followed by fever and cough;—the day preceding he had arrived in good health from Goa. It did not appear that any treatment had been adopted before he applied to the hospital. On admission the skin was hot and dry,—pulse 120, small and soft,—respiration 40,—tongue dry and coated in the middle, but florid at the tip and edges,—frequent cough, with adhesive opaque sputa. The right side of the chest moved less freely than the left, and from the 3rd rib downwards there was complete dulness with blowing respiration, mixed with sibilant and sonorous rhonchi. In the lateral and dorsal regions of this side the resonance was defective, and the respiration somewhat blowing. Leeches were applied to the epigastrium and about the right nipple, and calomel and Dover's powder at bed-time, and saline draught with antimony given; a purgative enema was also administered. On the following day there was a partial remission of the fever, though the tongue continued dry. Quinine in 8-grain doses was given with blue pill and ipecac. every third hour for 3 times. An exacerbation came on in the evening, and continued through the night. The next morning the pulse was 130,—tongue dry,—frequent hiccup,—cough urgent,—and the sputa rusty. Subcrepitant rhonchus was heard in the mammary and axillary regions. The medicine was continued, with the addition of 20 drops of nitric ether. There was less fever in the evening, and he passed a better night. At the morning visit the pulse was 104,—cough less troublesome, and sputa less rusty,—tongue continued dry and coated. A blister was applied to the right side of the chest, and the

medicine repeated. On the morning of the 6th, it was noted that he had passed a restless night from constant hiccup; the skin was coldish;—pulse 116, very easily compressible,—respiration 60,—cough very troublesome,—sputa more rusty. Sesquicarbonate of ammonia in 5-grain doses was ordered every third hour, with chicken broth, sago, and wine. The skin became cold and clammy, the breathing oppressed, and he died in the course of the night.

*Inspection* 11 *hours after death. Body.*—Not much emaciated. *Chest.*—On the right side, the pleuræ were adherent by soft and easily broken down layers of lymph, and there was about ½ an ounce of puriform fluid in the cavity. The visceral layer was rough and marked by patches of redness; the lobes of the lung were closely adherent; the middle lobe was consolidated, easily breaking down under the finger, and infiltrated with puriform fluid. Near the surface, both in front and behind, the lung crepitated freely. On the visceral layer of the pericardium (upon the anterior surface of the heart) there were opaque spots with numerous red patches, and in the sac about ½ oz. of puriform fluid. Pale fibrinous coagula were found in the left ventricle. *Abdomen.*—The liver reached about two inches below the margin of the ribs;—it was mottled, red and yellow. The kidneys were greatly enlarged, each weighing seven ounces. The cortical part, of a pale buff colour, encroached upon the tubules, and nearly concealed them.

(V.) The comparative infrequency with which abscess of the liver opens into the sac of the peritoneum renders the following case interesting:—

Case X.—*A large abscess, occupying left and part of right lobe of liver, opening just before death into Peritoneal Sac: Adhesions of convex surface of liver to abdominal wall: Ulceration of large intestines.*

H. G., aged 40; Mahratta; coolie; native of Concan; resident in Bombay 15 years; admitted into clinical ward 21st June 1855. He was emaciated, and had irregular accessions of fever. In the epigastric, encroaching upon both hypochondriac regions, there was a prominent globular fluctuating swelling of about the size of a cocoanut. Its lower edge was well-defined and reached nearly to the umbilicus; above, it passed beneath the margins of the ribs; it was tender to the touch, but the skin was neither hot nor red. Tongue florid,—pulse feeble,—bowels loose, and stools mixed with mucous and blood. He stated that 15 days before admission he felt pain in the right side, which was soon followed by febrile heat; the fever continued without abatement for 6 days, since which period it has intermitted. The pain was very severe at first, but it afterwards became less. Attributed the attack to exposure to cold. Was believed to be intemperate in his habits; had never received an injury. He was treated chiefly for the dysenteric symptoms. He suffered much from abdominal pain up to the time of his death, which occurred 4 days after admission.

*Inspection, 3 hours after death. Chest.*—On opening the chest the lungs collapsed freely; the right lung for the most part healthy, but near its

anterior edge there were several circumscribed spots hard to the touch and of dark colour. On incision, a cheesy-like substance oozed out from the minute bronchial tubes: the left lung and the heart healthy. *Abdomen.*—On opening the abdomen, recent and easily broken down adhesions were found between the convex surface of the liver and the wall of the abdomen, and its lower edge was firmly matted to the stomach, transverse colon, and omentum. Twenty-four ounces of pus were found in the peritoneal sac. The intestines were for the most part congested and distended;—here and there the convolutions were adherent by flakes of lymph. The liver reached upwards to the 4th intercostal space; the entire of the left lobe and part of the right was occupied by an abscess, the wall of which was lined by a membrane. The communication between the abscess and the peritoneal sac was situated between the left lobe near its anterior edge. The sac of the abscess and the peritoneal sac together contained 4 pints of pus. The small intestines were healthy.

The mucous membrane of the cœcum was of a black color and softer than usual. There were ulcers on the mucous membrane of the large intestines—some circular, others oval and transverse in direction. The mucous follicles generally were turgid and marked by a depression in the centre. A large ulcer (about 8 lines in length and 6 in breadth) was situated in the cœcum near the ileo-colic valve, its surface was sloughy and its margin surrounded by granular deposits.

(VI.) The following cases refer to inflammation of the peritoneum.

Idiopathic general peritonitis is certainly a rare disease in this country. The acute is more common than the chronic form. Of the latter there appears to be two varieties; 1st. Tubercular peritonitis; 2nd. Non-tubercular peritonitis. The non-tubercular form of chronic peritonitis is little noticed by systematic writers:—no account of it will be found in Dr. Watson's lectures. In Dr. Aikin's Hand-Book, it is discussed in 9 lines;—Dr. Symonds (Library of Medicine) expresses his belief that if not the consequence of an acute attack or of mechanical injury, or of disease of some abdominal organ, chronic peritonitis is confined to scrofulous subjects, and is in fact tubercular. Dr. Wood notices it as ordinary inflammation, and chiefly as the result of an ill-managed acute attack. It appears to have been first alluded to by Andral, and afterwards more fully noticed by Dr. Hodgkin. The first full, and, so far as I know, the best, description of it will be found in the 6th Number of these Transactions, p. 153, in a paper

by Dr. J. Scott, Inspector-General Medical Department, published in the year 1842. The substance of this paper is contained in Dr. Morehead's work, vol. II., p. 181, and in part also in the Lancet for 1858, vol. II., where this form of chronic peritonitis forms the subject of a clinical lecture by Dr. Ward of the "Dreadnought."

Chronic inflammation of the peritoneum in connection with tubercular deposit, is not so common a disease in this country as in Europe. Dr. Morehead refers to four cases, two of which occurred in Europeans.

CASE XI.—*Chronic Peritonitis; effusion of 20 ozs. of turbid serum with flakes of lymph into peritoneal sac, thickening in places of the latter membrane, and layers of imperfectly organised lymph attached to its surface. Bright's disease of kidney—left kidney weighed 9 ozs., right kidney 7 ozs. A Guinea Worm converted into calcareous matter in the sub-serous tissue. Tubercular deposit in both lungs.*

J. R.,—age 25; cart driver; native of Poona; 5 months in Bombay; Mahratta; of temperate habits; admitted into clinical ward July 11th, 1854. He stated that for 7 days he had been troubled with nightly accessions of fever, commencing at midnight and lasting till morning. Four days after admission, he was seized with dysenteric symptoms which yielded to small doses of ipecac. and gentian. The febrile accessions recurred at irregular periods, and were not checked by quinine in large doses. On the 23rd, the abdomen was observed to be swollen and tympanitic in the centre, but tumid at the sides. The bowels were constipated, but became loose after a dose of castor oil, and were found to contain mucous. A blister was applied to the abdomen and he took small doses of hyd. cum. creta, with Dover's powder. The distension of the abdomen increased, and he began to lose flesh. There were irregular accessions of fever, and occasionally a good deal of griping with some tenderness near the umbilicus. Leeches in small numbers were used and repeated, and small doses of ipecac., blue pill, and gentian given, followed in some days by the syrup of the iodide of iron. There was steady increase in the size of the abdomen, and fluctuation became distinct at the sides; the tympanitis continuing in front. There was also some puffiness about the neck and face latterly. Tubercular deposit was detected in both lungs, and the urine was found to be albuminous. He gradually lost flesh with progressive increase of the abdominal enlargement, the chest symptoms became more decided, and he sank 4 months after admission.

*Inspection 12 hours after death. Chest.*—There were miliary tubercles interspersed throughout the upper substance of the upper lobes of both lungs. In the pericardium there were about 2 ozs. of serum. *Abdomen.*—The peritoneal sac contained about 20 ozs. of turbid serum; there were flakes of lymph adhering to

the peritoneum which was in places thickened; liver weighed 2 lbs. 14 ozs., its surface was slightly nodulated. The outer surface of both kidneys was slightly lobulated, and paler than natural; the left weighed 9 ozs., and the right 7 ozs. There were patches of redness on the surface of each, underneath the fibrous investment. On a section the cortical part of both was found broader than usual, encroaching upon the tubular portion; it had a pale and granular appearance. Spleen weighed 5 ozs.

Case XII.—*Peritonitis—perforating ulcer of the ilium; symptoms coming during the action of a purgative.*

M. H., 45 years of age; a tolerably well conditioned Mussulman; was admitted into the J. J. Hospital on the 18th May 1854, under the care of Sub-Assistant Surgeon Moreshwar Junardun. He stated that 3 days previously he suffered from constipation of the bowels, for the relief of which he attended at the dispensary of the hospital where he received a dose of jalap (3i of the compound powder of jalap, it is believed). This purged him 6 times and made him vomit twice. In the course of the day he began to feel pain and tenderness of the abdomen, which increasing, he came to the hospital and was admitted on the following morning. *Symptoms on admission.*—Countenance anxious and pinched,—skin above the natural heat,—pulse small, frequent, and easily compressible,—intellect clear,—respiration short, hurried, and in a marked degree thoracic,—abdomen full and resistent and tender, the tenderness increasing on firm pressure,—tongue fissured and florid at the edges,—lies on the back with the legs drawn up,—bowels not moved since the purgative ceased to act,—has much thirst and vomits occasionally,—hiccup at times. Twenty-four leeches were applied to the abdomen, the latter was well fomented, and he was ordered calomel grs. ii, opium gr. i, every second hour. The leeches gave a little relief and the tension and pain of the abdomen were lessened. The tenderness afterwards became more marked, and the lower part of the abdomen tympanitic. The leeches were repeated, and the calomel increased to grs. iii, the opium being diminished to ¼ of a grain. He become weaker, the face more anxious, the abdomen more tender, and the tympanitic more general, and he died 3 days after admission.

*Inspection 15 hours after death.* On opening the cavity of the abdomen a considerable quantity of gas escaped from the peritoneal sac. The convolutions of the small intestines were glued together by layers (thick) of softish pulpy lymph, as was also the great omentum to the intestines. Upon the peritoneal surface of latter, there were spots of variable size of redness. On raising the omentum and separating the convolutions of the intestines, a quantity of yellow fluid was seen at the lower part of the abdominal, and in the pelvic cavity:—this was very fœtid, having a feculent odour. Tracing the small intestines from above downwards, a circular opening was found in the ileum about 3 inches from its termination in the colon. The edges were inverted, and the mucous membrane, for a space of about a line in diameter from the edges, was destroyed by ulceration.

CASE XIII.—*Chronic peritonitis in a person 25 years of age : tubercular deposit upon the pleuræ, and in lungs and spleen : ten pints of turbid fluid in the sac of the peritoneum : convolution of small intestines adherent by flakes of lymph.*

V., Mussulman; age 25; a weaver; believed to be of intemperate habits; native of Benares; was admitted in a very emaciated state into the clinical ward on the 26th November 1858.

The abdomen was greatly distended, not tender, fluctuating at the sides but tympanitic in front,—face pinched,—tongue florid,—pulse feeble,—urine scanty but without albumen,—heart sounds natural,—sonorous and sibilant rhonchi general,—had occasional cough, little or no expectoration. He stated that he had been affected for 4 months with the swelling of the abdomen. In the beginning he had also for a week or two irregular attacks of fever,—the face and feet had never been swollen. After his admission, it was noticed that he had hectic—the pulse rising in the evening to 110. The cough became more troublesome, but the swelling did not increase; he daily lost strength and flesh. Five days before his death, he was attacked with dysentery; he died on the 5th January about 5 weeks after his admission. The treatment consisted of diuretics, tonics, alteratives, and, latterly, astringents.

*Inspection* 10 *hours after death. Chest.*—Old adhesions of pleuræ on both sides; no fluid in the sac. Upon the pleuræ covering the pericardium and upon the mediastinal pleura, there were several nodular hard tubercular-like masses of about the size of a marble. There was no appearance of fibres, and cells were not visible under the microscope. The bronchial glands were enlarged. Similar deposits were abundant in the upper lobes of both lungs. There were about 2 ozs. of serous fluid in the pericardium. *Abdomen.*—There were about 10 ozs. of turbid fluid in the sac of the peritoneum. The convolutions of the small intestines and the parietal layer of the peritoneum were in places covered with thin flakes of lymph, soft, and easily broken down. In no place was the membrane thickened, it was somewhat paler than usual; the lining membrane of large intestines was reddened. The kidneys were of small size but healthy. The spleen was large, and contained a similar deposit to that found in the lungs.

# ANNUAL REPORT OF THE SANATARIUM, MOUNT ABOO.

*For the Year ending March 31st, 1859.*

BY W. C. ROE, M.D., ASSISTANT SURGEON H. M.'s 89TH FOOT,

In Medical Charge.

Presented by the Director-General Medical Department.

*Topography.*—Mount Aboo is situated about 50 miles N. E. of Deesa, and is a detached hill which rises abruptly from the plains to a height of about 5,500 feet above the level of the sea.

*Climate.*—The hot weather of last year (although it scarcely deserves the name) commenced early in April and continued until late in June. During this period, although the sun was powerful, the heat was always modified by a cool and agreeable breeze; and the thermometer ranged between 75° and 86° in the shade. The barracks, hospital, and private bungalows were never above an agreeable temperature, thus rendering the use of tatties, punkahs, thermantidotes, and other artificial means of cooling the air, quite unnecessary. This weather was succeeded by the monsoon which was ushered in by frequent thunder-storms and several well-marked and severe shocks of earthquake. The atmosphere during this period was cloudy, heavy, and evidently loaded with electricity. This weather was followed by the rains, which, although not of a heavy character, were constant and continued almost without cessation until the beginning of September. During the whole of this period the air was extremely humid, close, heavy, and generally very foggy in the morning. Although the weather was rather unpleasant, and precluded the possibility of out-door exercise or recreation, the troops were not at all unhealthy. The three months subsequent to the monsoon, although of an extremely agreeable temperature, were rather unhealthy; fevers being very frequent amongst the soldiers and residents who were not provided with houses on dry and elevated positions. The cold weather commenced early

in December, and continued for about 3 months. During this time the thermometer ranged from 40° to 69°, and during the prevalence of E. and N. E. winds the weather was rather chilly, but most bracing and invigorating.

*Station.*—The Station is situated about 4,100 feet above the level of the sea, it is built very irregularly, and extends over a considerable space of ground. It at present consists of temporary barracks and hospital, with about sixteen private bungalows, which, in consequence of the broken state of the ground, are very much apart and chiefly built on small elevations.

*Barracks.*—The buildings at present used as barracks are situated within about 200 yards of,—and almost on a level with,—a large lake, in a confined ravine which is low, damp, and, as was too well proved during the months subsequent to last monsoon, a very unhealthy situation. These buildings consist of four temporary wattle-and-daub pendalls, two of which are now unoccupied, from being in a dilapidated and dangerous state; the other two have been erected since this time twelve months, one of which is in a better position than the other three, and both those lately built are of superior construction to those now unoccupied. The two pendalls now in use are about 100 feet long by 20 feet broad, and are lofty and very well ventilated. Although these barracks answer the purposes for which they are required so long as the weather remains dry, they are totally unsuited (from their position and temporary construction) for the accommodation of soldiers during and subsequent to the monsoon.

*Hospital.*—The sanatarium hospital is very much better located than the barracks; but the present buildings are not well adapted for hospital purposes, as they are constructed of perishable materials, which become thoroughly damp during the monsoon, to (in my opinion) the detriment of the health of the patients; they also are not sufficiently extensive or well ventilated, and furthermore the Executive Engineer has recently pronounced them to be in a rotten and consequently dangerous state. The out-buildings are not sufficient to meet the requirements of the hospital, neither is there, as far as I am aware, any space whereon to erect additional buildings. There is at present a large pendall being erected in a good position, for the accommodation

of the wives and families of the soldiers. This I think should, as an emergent measure and in consequence of the faulty state of the present barracks and hospital, be made available for barrack or hospital purposes until more suitable buildings can be erected; and this arrangement is the more to be desired as I understand that it is the intention of the authorities to increase the number of troops at this station.

*Strength.*—The average strength during the past year has been 135.

*Diet.*—The diet of the soldiers consists of three meals per diem, and is composed of the following articles of food :—Bread 1 lb., meat 1 lb., rice 4 oz., salt 1 oz., sugar 2½ oz., tea $\frac{5}{7}$ oz., vegetables 1 lb. The meat ration, with the exception of an occasional issue of salt beef or pork, consists exclusively of mutton; the consequence of which is, that the men, and particularly those just convalescent, complain of a loathing of food, and frequently have expressed a wish for a change of diet. This is much to be deplored, and, if possible, some alterations should in this respect be made in the existing contracts. Although the soil of Aboo is capable of producing nearly all the European vegetables in perfection, they have not as yet been cultivated to any extent, and the vegetables issued to the troops are, for the most part, brought from Deesa, and consist chiefly of pumpkins, onions, and potatoes.

*Duty.*—In consequence of there being many cases of fever, the duties of the soldiers were rather severe during the months subsequent to the monsoon,—the disturbed state of the country rendering patrols and picquets necessary.

*Recreation.*—The soldiers at Aboo are not provided with many sources of amusement. A billiard table was presented to the men by the late Sir Henry Lawrence; which afforded recreation during the monsoon, but it was unfortunately injured during the mutiny and has not been since repaired. There is also a small library for the use of the soldiers, and when the weather permits, the men play at quoits, bowls, and cricket.

*Crimes.*—The soldiers during the past year have been temperate and well conducted.

*Fevers.*—Fevers have been very frequent during the months of September, October, November, and December; the most prevailing form was that of the intermittent type, of which no less than 22 cases were treated.

*Diseases of the Lungs.*—Thirteen cases of diseases of the lungs were treated during the year. One of them (a case of pneumonia) had a fatal termination, the disease running rapidly into hepatization and suppuration. The *post mortem* examination showed a considerable amount of tubercular matter deposited on and in the substance of both lungs, together with engorgement of and numerous small abcesses in the inflamed lung.

*Diseases of the Liver.*—Eight cases of diseases of the liver were treated; of these four were acute, and four chronic. The treatment adopted in these cases consisted chiefly of mercurials, acids internally and externally, and the iodide of potassium in combination with tonics.

*Diseases of the Stomach and Bowels.*—There were thirty cases of diseases of the stomach and bowels treated during the past year, most of which were of a mild nature. One case of cholera occurred, but it was not of a severe character, and gave way under the usual treatment.

*Diseases of the Brain.*—Five cases of diseases of the brain were treated; of these, one was a rather severe case of delirium tremens, and required very powerful opiates for its cure.

*Rheumatic Affections.*—Eight cases of rheumatism received treatment; they were nearly all of long standing and accompanied with debility, and were chiefly of an obstinate character.

*Venereal Affections.*—Twenty-one patients were treated for venereal affections; of these, no less than seven suffered from secondary symptoms, consequent on primary disease contracted previous to the arrival of the patients in India. Some of these cases proved extremely obstinate, and particularly those that had been treated with mercury for the primary disease.

*Abscessus et Ulcus.*—Eleven cases of abscesses and ulcers occurred during the year, none of which presented any peculiarities.

*Wounds and Injuries.*—Of wounds and injuries ten cases were treated, one of which was a case of dislocation of the semilunar

cartilages of the knee-joint. Great difficulty was at first experienced in reducing it, but it was at length speedily and easily accomplished by flexing the limb and then suddenly extending it, the patient having been previously placed under the influence of chloroform.

*Diseases of the Eyes.*—Six cases of ophthalmia have been treated during the year, chiefly conjunctivitis and corneitis, and, in the majority of instances, accompanied by, and dependent on, a scrofulous diathesis.

*Dracunculus.*—Since the arrival of a detachment of H. M.'s 33rd Regt. at this station, numerous cases of "guineaworm" have occurred amongst the men of that corps, and on inquiry I have ascertained that all the men thus attacked were stationed some time previous at Ahmednuggur.

*Remarks.*—The great influx of European troops to this country during the mutiny, now happily past, and the probability that a large proportion of them will be retained for a considerable length of time, renders it a question of vital importance how they are to be maintained in a state of the greatest efficiency. That the climate of India is prejudicial to the constitutions of Europeans, and also that Europeans, when debilitated by the diseases and excessive heats of the plains, do, in most instances, derive very considerable benefit from residing at hill stations, are facts that are well known and incontrovertible. If, therefore, the climate of a hill sanatarium is so beneficial to the invalid from the plains, it must also have a decided tendency to preserve the health of those who do not suffer from any disease; and to effect this latter very desirable result, I think that the hill stations should be largely taken advantage of, and that all the troops not actually required in the plains should be located on the hills;—in fact that the hill stations should be, not only sanataria, but also large military depôts, where the recruit, lately arrived from England, would become acclimatised, and where the old soldier suffering from the effects of forced marches and harassing duties, would find a resting-place that would soon restore his constitution to its former vigor.

Mount Aboo, from its comparatively central position and many local advantages, is, I think, particularly well adapted for a

large hill station and sanatarium; and when we take into consideration that it is situated in Rajpootana and on the borders of Guzerat, where fevers and other debilitating diseases are rife, and where there is no other hill station or sanatarium, the conclusion is easily arrived at, that we should, in every possible manner, take advantage of its position, and avail ourselves of the benefits of its health-restoring climate. As I have already stated, the present barracks and hospital are not sufficiently extensive, and are so badly situated (more particularly the barracks) that the benefits of the pure mountain-air are, if not entirely lost, certainly well-nigh counterbalanced by the noxious and fever-bearing miasma that arises from the confined and swampy ravine in and near which they are built. To exemplify the unhealthiness and, I may almost say, total unfitness of the present barracks for the accommodation of European soldiers, I have only to refer to the hospital records for the three months subsequent to the last monsoon. During the month of October, with an average strength of 176 men, no fewer than 71 were admitted into hospital with fever alone; in November, with an average strength of 123, 78 men were admitted with the same disease; and in the month of December, with an average strength of 93, 45 men were admitted, all well-marked cases of fever, chiefly of the intermittent type. During the months of January, February, and March the number of cases of fever rapidly diminished, and at present not even one fever case is under treatment. This rapid decrease of the number of fever-patients is easily accounted for by the ground adjacent to the barracks having become perfectly dry about the middle of December. To still further prove the unhealthiness of the present barracks, I may mention, in contrast with them, the Aboo Lawrence School, which is situated in a dry and elevated position, and amongst the inmates of which, fever is almost unknown.

From the foregoing remarks the conclusion may be arrived at, that, although the climate of Mount Aboo is in general healthy and bracing, it is absolutely necessary (in consequence of the extreme humidity of the atmosphere during the monsoon, and the hurtful miasma which arises in some localities during the subsequent months) to select for the sites of barracks and hos-

pitals only those positions that are dry and elevated. Taking these facts into consideration, I think there can be little doubt about the prudence of *at once* erecting suitable buildings on carefully selected sites, for the accommodation of at least those men who are sent up from the plains debilitated with fevers and other diseases, for it has too frequently happened that a patient has been sent up here suffering from the effects of fever, which subsiding under appropriate treatment, the man was sent to duty at the barracks, but generally returned to the hospital in a few days, again suffering from his former complaint.

There are two positions near the station at Mount Aboo which are well adapted for building purposes. One of these, called Gundermuck, is situated about three-quarters of a mile to the N. E. of the present barracks: it is an elevated and level plateau, and, with the exception of one small spot (which can be easily drained), it is one of the driest places on the hill, and there is a building space here of about one hundred and sixty yards frontage; there are also several good wells and a constant running stream in the vicinity. The other position is about a mile in an easterly direction from the present barracks; it is also dry and elevated, and much more extensive than Gundermuck; it is also well supplied with water, and an extensive parade ground could be easily made in the immediate neighbourhood.

Besides the selection of dry and elevated sites, it is, I think, also necessary in the erection of barracks and hospitals at this station to observe the following rules:—

1. The foundation of the building should always be well raised above the adjacent ground to secure its dryness during the monsoon.

2. The walls of the building should invariably be built of stone or well-burned bricks to obviate what usually happens in buildings not so constructed,—namely, the thorough saturation of the walls of the building during the wet season.

3. The floors should be made "pukka" with chunam or with, what is better, large well-dried bricks.

4. The verandahs should be very deep, and on the monsoon side protected by shutters on the "Venetian-blind" principle, to admit a sufficient supply of pure air, to protect the building

from the rain, and, at the same time, to provide the men with a dry space for recreation during the monsoon.

5. The ground adjacent to the building should be thoroughly drained, and no bathing-rooms should be erected in or near an occupied building.

6. The roofs should always be tiled, thatch retaining the moisture, and having a tendency to generate vermin.

7. There should be a drying-room attached to each building, for the purpose of airing the clothing of the soldiers during the rainy season, and to prevent, what too frequently happens, the absolute necessity of soldiers going on duty in wet clothes.

If the much-required barracks and hospitals were erected in the observance of these and other measures calculated to obviate the humidity of the atmosphere (which is the only drawback of the climate), Mount Aboo could, I am convinced, with ease and without any undue outlay, be made in reality, what it is now in name,—a sanatarium.

# CASES OF DISEASED FOOT.

BY SUB-ASSISTANT SURGEON BAZONJEE RUSTOMJEE.

In medical charge of the Bhooj and afterwards of the Kurrachee Dispensary.

Presented by the Director-General, Medical Department.

The following cases relate to a disease peculiar to Kutch* and Kattywar, not having been met with, as far as I am aware, elsewhere in this Presidency except in some parts of Sind, although not unknown at Madras and at Aden.

*Symptoms.*—In the early stage there is little or no swelling of the foot; the integuments are natural in colour, or slightly congested and hot, having on the surface elevations which, when burst or opened, allow a thin yellowish puriform discharge to exude,—the discharge containing granules like those of poppy. Sinuses are not present, and when one exists, it does not run deep into the osseous texture, and in consequence the latter does not impart any grating feeling of caries. In fact the destruction of bone has not yet taken place. The skin on the plantar surface is irregularly thickened and converted into knots at intervals, and gives, on handling, the feeling of lumps. The foot cannot be laid flat on the ground from pain, and the patient is obliged to walk on the heel.† As the disease advances, the swelling of the foot increases to three or four times the size of the sound foot, and in some instances the natural outlines of the tarsus and metatarsus are effaced, the whole foot being converted into an oval mass; the toes looking like so many appendices projecting from a monstrosity. The skin is congested and livid, occasionally thickened, and invariably penetrated by sinuses which are often more numerous on the dorsal than on the plantar aspect of the

* The Natives of Kutch know the disease by the name of "*kireedeo*," probably from the number of openings on the foot which give it the appearance of being eaten up by ants.

† I put down these as the symptoms of the early stage of foot disease with diffidence, as they are based on the observations of a single case.

limb. In one or two instances I have counted upwards of two dozen openings of sinuses through which a puriform or sanious, often fœtid, discharge escapes. The discharge abounds in granular yellow bodies of the size of mustard seeds, or contains disintegrated osseous tissue. A probe passes quite easily into the interior of the bones meeting with no resistance from the deeper seated textures. In exceptional cases, instead of livid skin there are white patches on the surface of the foot, not unlike those of leprosy and resembling the white cicatrices of burns. This appearance of the skin was seen in two instances. In rare cases there is limited swelling, and lividity of the foot, and the disease is confined to the tarsus (*vide* case No. 5).

*Pathology.*—The disease is mostly seated in the right foot;—at least in all the eight cases treated, and four or five others witnessed by me it occupied the right limb. The progress of one form of the disease is much like that of tubercular phthisis. From some external injury or by irritation from the presence of a guinea worm, as in case No. 2, acting as exciting causes, a minute deposit takes place in the tarsal bones in their spongy tissue. Gradually the deposit increases like the excretion of turbercular matter in the second stage of consumption. A yellow process of inflammation now sets in among the surrounding soft parts, manifested by the integuments becoming livid and converted in places into little abscesses, which burst in time, and leave sinuous openings, from which the matter pent up internally takes exit. The granular soft yellow deposit also follows, and is prevented appearing sooner on the surface, as the external laminated tissue of the tarsal bones opposes a strong hard wall to its exit, and in the end the laminary structure also softens down. Such I believe to be the pathology of one form of the disease. In another form in which the granular deposit is absent, as in cases No. 5, 6, and 7, there takes place a softening of the spongy tissue of the bones by a process of chronic inflammation, in which the other structures participate, and as these latter are destroyed by interstitial absorption they leave sinuses as in the other form. The spongy tissue being softened, is replaced by a tissue of lower organization,—a substance dark in colour and soft and thick in consistence. The laminated texture in contact

with the cancellated portion finally disintegrates into thin plates, and portions of it may be observed in the discharges. It may be that the granular deposit is purulent effusion, the result of slow inflammatory process, and assumes its peculiar form in the tarsus, on accout of its being pent up inside the laminated tissue. The softening of the spongy tissue and its replacement by a soft thick dark coloured substance, are advanced stages of one and the same process.

These pathological views are, I beg to state, mere suggestions from partial observations, and may be looked upon as theoretical. I have stated above, that the progress of one form of the disease is like that of tubercular phthisis, and three different stages may be observed in it, as in the diathetic disease, but it should not be supposed that consumption accompanies foot disease. On the other hand in all the cases observed by me, there is no trace of *phthisis pulmonalis*. Again there was nothing in the progress of the disease so debilitating as in consumption. It occurred in robust as well as emaciated individuals.

*Morbid appearances.*—The foot is more or less swollen. Skin covering it is dark coloured and livid, and penetrated by sinuses, some of which are soft enough to admit a blow-pipe. A knife easily enters through the deeper structures which are softened and disintegrated, but in some cases the instrument meets with resistance when it comes across a healthy tarsal bone during the cutting. On incision a quantity of matter, purulent or sanious and fœtid, with or without granules, is discharged. A peculiar odour like that of putrefaction is emitted by the cut parts in some cases. When the disease has advanced to its highest pitch all the tarsal and metatarsal bones are softened, the cancellated and laminated textures included, and are beset with masses of conglomerated yellow granular bodies, these bodies pulpifying into a substance resembling ground grain, as in case No. 2. In other instances there is no deposit of the kind, the spongy tissue of the calcaneum is degenerated into a dark thick soft semifluid mass, and the hard laminæ in contact being affected are disintegrated into thin osseous plates. The astragalus also participates in the disease to some extent, but the other bones of the foot are generally sound or more or less softened, as they

could be easily cut. In case No. 7, the articular end of the tibia was also seen affected, and on the bone being sawn through, about two inches above the articulating end, a quantity of thin purulent liquid escaped from the medullary portion.

*Treatment.*—Looking upon this disease as a species of caries peculiar to India, I treated the first case in the early stage, with the remedies which are useful in true caries. I gave the patient cod-liver oil in two-drachm doses twice daily, after meals, for a month; and tried the iodide of potassium in three-grain doses thrice daily in an infusion of chiretta for a fortnight; but without benefit. There was no other resource left but removal of the affected part. Accordingly, with the consent of the patient, Syme's operation at the ankle-joint was performed, and the boy recovered with a tolerably good stump. He was provided with a boot, and was able to walk with the assistance of crutches when he left the hospital. About seven months after his discharge, I saw his brother in Kurrachee, and he told me that the boy was able to walk with the assistance of only one crutch. In the other seven cases, amputation of the leg was performed, and they all made good recoveries. Two of them were provided with wooden legs, the rest did not wait to receive them, as they were eager to proceed to their native land.

No. 1.—*Diseased foot in the early stage; Syme's amputation at the ankle; recovery.*

P., aged 17, a Rajpoot of Mathura in Kutch; a farmer; was admitted in the Bhooj Dispensary on the 22nd Dec. 1857. The right foot is somewhat swollen, the swelling being greater on the plantar than on the dorsal surface, which is covered in places with elevations, more especially between the clefts of the toes, which, when burst or opened, discharge thin yellowish matter which contains granules not unlike those of the poppy. The eminences are not observable above the arch of the foot. In the middle of the foot, in a line with the second toe, is a sinus through which a probe can be passed half an inch deep, but no grating of bones detected. The swelling on the plantar surface is more like thickening of the subjacent tissues, and on handling gives the feeling of lumps. In this part of the foot, the elevations of the nature above described are few in number and scattered. The skin of the heel to the extent of 3 inches is healthy. On the dorsum it is slightly corrugated and hot. Much pain is felt in attempting to walk with the foot flat on the ground. The patient, therefore, prefers walking on the heel He is robust and in good health. Feels feverish at times. No chest com-

plaint. Took two drachms of cod liver oil twice a day, after meals, up to 21st January 1858, and from 22nd January to 5th February iodide of potassium in three-grain doses thrice daily in infusion of chiretta, but without any effect.

*February 6th.*—The constitutional treatment, after a fair trial for a month and a half, having little effect, and the patient being willing to submit to an operation from fear of the disease extending upwards, he was chloroformized, and an incision was made in a curved direction from one malleolus to the other, and carried deep through the sole of the foot to meet at its point of commencement. The heel-flap, having been dissected, was turned behind, and the joint opened in front by dividing the ligaments. The structures over the articulating surfaces of the tibia being cleared off, a small slip of the malleoli was sawn through;—four ligatures and five sutures were applied. About six ounces of blood lost: wetted lint compresses and a light bandage were applied. During the whole of the operation, Mr. Sadashew Hemraj, Physician to His Highness the Rao of Kutch, kindly assisted me. An examination of the foot was made, but the paper containing the appearances observed is lost. My impression is, that, amidst the cancellated texture of some of the tarsal bones, minute isolated granules were detected, and the substance itself was softer.

*March 2nd.*—The stump after being inclined to slough was treated with zinc lotion and dressing, leaving a cicatrix about an eighth of an inch at its upper part, and the man was able to walk wearing a boot with a high heel and a soft pad inside. He was discharged on the 22nd April 1858.

No. 2.—*Extensive disease of the foot; amputation of the leg; recovery.*

G., a Mussalman; aged 35; native of Venjan, in Kutch; was admitted on the 12th February 1858, with disease of seven years' standing. The whole of the right foot is converted into a large oval mass, effacing the natural outlines of the tarsus and metatarsus. The skin covering it is dark coloured and thickened, the thickening being in the subcutaneous areolar tissue. In places there are sinuous openings through which a probe passes quite easily into the interior of the bones. On the external cutis there are a few vesicles which, when burst, allow a quantity of thin liquid, containing granules about the size of mustard seeds, to escape. Near the inner malleolus, behind the os calcis, at the insertion of the tendo-Achilles, are two tolerably large swellings which are fluctuating, and give the impression of the presence of matter. These, on being opened, discharge large quantities of thick sanious pus, containing a number of the mustard-sized yellow bodies, as in the vesicles. The natural outline of the toes are alone distinctly visible. The patient is in pretty good health; bowels regular; has no chest complaints; feels feverish occasionally.

The history is, that about nine years ago he had first a guinea worm in the sole of his foot, at its middle. The worm came out, and a small hard tumour made its appearance in the same situation. This tumour gradually increased

in size, till it arrived to the magnitude of a large mango; it was removed by a European medical gentleman. After this, he experienced comparative relief for a period of twenty months. About seven years ago, a vesicle, not unlike that of dracunculus, appeared on the same spot, and since that time, the disease began to make its ravages, by invading the interior and encroaching on the exterior of the foot.

*20th February.*—To-day the patient was brought under the influence of chloroform, and the usual flap operation of the leg was performed at its upper third. About four ounces of blood were lost; three arteries were ligatured, and the flaps brought together with six sutures; wetted lint and light bandage were applied. Afterwards, when he recovered from the effect of chloroform, a full opiate was given.

The amputated limb, on being examined, presented the following appearances:—the foot swollen; subcutaneous areolar tissue thickened, and, on incision, discharging thin dark liquid. Deeper still, and in the interior of the osseous tissue, the knife penetrates easily as through soft fleshy structures. These parts are the seat of numerous soft yellow deposits not unlike tubercle in the lungs. A touch of the knife pulpifies them into a consistence resembling ground grain flour. These deposits are uniform throughout the whole foot, and the softening is greater at the metatarsal than at the tarsal end. Most of the deposits were aggregated into small masses as in the second stage of phthisis. Above the metatarsal end of the third toe is a large cavity with thick rough walls, containing sanious purulent matter, full of the deposits above described. Immediately beneath the cellular tissue on the under surface of the toes, the granular deposits were separate and like mustard seeds. On tracing the disease further up, no marks of the deposits were detected in the bones of the leg. Thus, in this instance, all the tarsal and metatarsal bones were softened and disintegrated. There was some sloughing at first, but, in course of time, the whole healed and a good well-formed stump was obtained; the man was provided with a wooden leg, and discharged on the 22nd April 1858.

No. 3.—*Diseased foot in advanced stage; amputation of leg; cure.*

P., female; aged 42; native of Pudder, near Augor, in Kutch; disease of twelve years' standing; was admitted on the 5th February 1858. The right foot is greatly swollen and thickened, the skin over it has lost its natural colour, and is penetrated in more than half a dozen places by sinuses, through which a probe can be passed to the depth of, and even into the structure of the bones, without detecting either the click of the external laminated tissue, or grating of the carious spongy tissue. In a curved line with the toes at the metatarso-phalangeal articulation, the skin over the huge swelling of the foot is raised, as it were, into a number of vesicles; one of which, on being cut open, discharged a quantity of thin dark liquid containing granules like poppy, though some of them were larger and yellow more like tubercular matter. The plantar surface of the foot has lost its

flatness, and is embedded in a swelling like the dorsum. Here a large swelling is divided into a number of small ones, having a nodulated appearance. On this surface the deposit is isolated. Only one sinuous opening present through which a probe reaches easily into the interior of the tarsal bones. No bad fœtor.

The disease has been twelve years in existence, and has reduced the patient a great deal. Her features are wan and shrivelled up; she is subject to febrile attacks. Bowels said to be regular; pulse small and easily compressible; nothing abnormal detected on examination of the chest. A proper account of the history and progress of the disease could not be had of her.

*February 17th.*—The patient, eagerly desirous of being relieved of the diseased limb, was this morning brought under the influence of chloroform, and the leg amputated at its upper third by taking flaps from the front and calf of the leg; the interosseous tissue being cleared off, the bones were sawn through; three arteries required ligature, and five sutures were applied to bring the flaps into apposition. Strapping, wetted lint, and light bandage concluded the operation. About two ounces of blood were lost during the operation. After the influence of chloroform was over, a full opiate was administered.

On examination of the limb, swelling, lividity, and perforations were seen externally. A dissecting knife easily entered into its substance, and went right through the textures without meeting any obstruction from them. The cut section was seen studded with soft granular deposit of a yellow colour. There was no trace of the cancelli, and the laminated texture had mostly degenerated; but in places a faint click was audible as the knife came across portions of it. The yellow deposit was conglomerated into masses of various sizes, and substituted for the spongy tissue. A minute piece of the tibia exfoliated afterwards, and she was discharged on the 30th March with an excellent stump.

No. 4.—*Disease of the Foot of 7 years' standing; amputation; cure.*

A Mussulman, potter, aged 20, native of Turms, in the Wagur districts of Kutch; was admitted on 22nd March 1858. The right foot is enlarged to three times the size of the left. On its dorsal surface, there are two sinuous openings in a line with the third toe, and a third sinus is situated on the metatarsus, in a line between the cleft of 1st and 2nd toes. The latter discharges a good deal of yellowish matter, containing granular bodies in numbers. The skin, here, is quite livid, and the lividity extends as high up as the lower third of the leg. In some places instead of the livid skin, there are white patches not very unlike those of leprosy, and nearly resembling the white cicatrices of burns. On the plantar surface, the skin is also livid and corrugated throughout, except that covering the heel to the extent of two and a half inches, which is natural. A large white patch on the inner side of the sole of the foot contains a sinus, through which a probe passes quite to the tarsal bones. The patient has a spare frame of body, and is nervous; pulse small and weak; bowels regular, no febrile disturbance or chest disease.

30*th*.—The patient, being willing to submit to amputation, was brought under the influence of chloroform, and the usual flap operation was performed, the popliteal artery having been compressed with a tourinquet above the knee. Three large arteries, a small artery in the museular flap, and a vein which bled profusely were ligatured; seven sutures were applied, and the coagula being removed the whole was lightly bandaged. Some time after sensibility was restored, half a draehm of laudanum was given. In this instance there was also bleeding from the bone, but it was eheeked with eold water application. The examination of the limb after amputation showed that the skin was thicker than natural, and adherent to the parts beneath. A knife easily entered through the substanee of the tarsal bones. Their eancellated texture was beset with few and scattered granules like those of tubereular lymph. The laminated portions pretty hard. In the os calcis and astragalus, traces of the deposit were not visible, but they had undergone softening and were eut into with slight difficulty.

*Vesp*.—No bleeding from the stump, but feels pain in it; is feverish; has not passed his urine since the operation. The progress of the ease from this date was very tedious up to the 22nd April, when he was diseharged quite well—the stump having entirely healed.*

No. 5.—*Disease of the Foot of* 8 *years' standing; amputation; cure.*

A Hindoo farmer, aged 25; native of Oonjea in Kutch, applied at the Bhooj dispensary 1st April 1858. The right foot is swollen from its arch, commeneing from the lower part of the tarsus up to the heel longitudinally, and from the malleoli to the sole, as far as the hollow on its plantar surfaee. The skin over it is of a livid colour and penetrated by a number of sinuses, through which a probe can be passed into the substanee of the bones, meeting little or no resistanee. The sinuous openings diseharge a good deal of puriform matter of a thin consistenee, but, unlike the previous eases, no granules are observable. In the sole of the foot there is only one sinus. The whole of the metatarsus is apparently unaffeeted; the skin eovering it is natural in colour. The patient is in good health, of robust habit of body; does not suffer any eonstitutional disturbanee; bowels in good order. He says that a thorn penetrated into his foot eight years ago, and since then the disease has manifested itself.

10*th*.—The patient, being willing to submit to operation for the removal of the limb, was brought under the influenee of æther, as the supply of chloroform was exhausted. Flap amputation of the leg was performed a little above the middle of the limb, the popliteal artery being eompressed above the knee. Four ligatures and sutures were applied, and the whole lightly bandaged. After the operation a full opiate was given.

*Examination of the removed limb*.—On cutting into the tarsus, the tendons and other structures were found soft and degenerated, imparting a peculiar odour very like that of putrefaction. The granular deposit, so abundant

* *Note by the Secretary*.—The Sub-Assistant Surgeon details the case in full to exemplify the bad effects of a vein being tied.

in the other cases, was not at all observable. The bones were quite soft, and the spongy tissue composing them was substituted by dark soft round masses protected by the hard laminated tissue investing it. This dark substance, on being removed, which was very easily done, left cavities. The only part of the astragalus that was seen implicated in the disease, was that in contact with the cuboid bone, the rest of it being healthy.

He was discharged well on the 7th June, and provided with a wooden leg.

No. 6.—*Disease of the Foot of 9 years' standing; amputation; cure.*

A Mussulman farmer, 34 years old; native of Kummagoons in Kutch; was admitted as an in-patient of the Bhooj dispensary on 1st July 1858.

Has disease of the right foot, so commonly seen in this province. The skin is congested up to the ankle-joint, and beset with sinuses, which are more numerous in the sole than on the dorsum of the foot. A probe passes quite as easily as usual, and indicates the destruction of bony tissue and its degeneration. The foot is swollen, and four times as large as the sound foot. There is purulent fœtid discharge through the openings but no granules as in the other cases. He is tall and of robust frame of body.

*3rd.*—Flap amputation of the leg performed in the ordinary manner, and the stump healed in less than a month.

Somehow or other, I forgot to make an examination of the limb till four days after the operation, and putrefaction having already set in, nothing satisfactory was made out.

He was anxious to proceed to his native village, and was discharged on the 9th August.

No. 7.—*Disease of the Foot of 3 years' standing; amputation; cure.*

A Mussulman cowherd, native of Jam Bela in Upper Sind; was admitted in the Kurrachee Charitable Dispensary.

*26th January* 1859.—The right foot is distorted as if affected with talipes equinus: the heel is raised and the toes rest on the ground. The skin over it is livid, and over the tarsus penetrated by a number of sinuses, which are more numerous on its plantar than on its dorsal surface. There are a few small circular ulcers near the heel. A probe, passed through one of these openings, enters easily through the deeper structures, the osseous tissue being altogether softened and disintegrated. A thin, extremely fœtid, discharge oozes out of these openings. The leg is kept in a semiflexed position from rigidity of the ham-string muscles. He is extremely emaciated, the subject of privations and long suffering: says he has neither cough nor fever; bowels regular; pulse small, very easily compressible. The history given by him is not clear.

Charcoal poultice was applied to the foot, and he took infus. chiretta and dilute nitric acid three times a day, with an ounce of wine twice in the day, for 3 days.

*29th.*—At the patient's own earnest request, he was brought under the influence of chloroform, and flap operation of the leg was performed about two inches below the tuberosity of the tibia, the popliteal artery was com-

pressed with a tourinquet previously; three arteries ligatured, and six arteries applied, and the stump covered with water dressing and lightly bandaged.

℞ mist. camphor ℥ii., tinct. opii. ℥ss, statim. The draught to be repeated at bed time; to have wine 1½ oz. every 6 hours, with sago congee and milk.

Half an hour after the operation, the limb was minutely examined. The skin of the whole foot, as well as that of the leg about two inches above the ankle-joint, was livid, and penetrated with sinuses, which were rather large holes near the heel. Some of these holes were big enough to admit a blow-pipe, which on introduction passed without any resistance,—the internal structures being altogether eaten up. A knife passed right through the substance of the bones, the os calcis was disintegrated into thin plates, which consisted of the outer compact laminated tissue, the spongy texture being converted into a dark thick gelatinous fluid. The other bones of the tarsus were softer than natural, and did not, except the astragalus to a slight extent, present the appearance of disintegration like the calcaneum. The metatarsal and phalangeal bones were also somewhat softer than natural, but otherwise healthy. The end of the tibia was also softened, and the bone, on being sawn through at its lower third, a thin puriform substance came out of the medullary structure which was loose in its arrangement, and had not the usual healthy appearance.

The ligatures separated on the sixth day, since which the stump healed rapidly. He took the chiretta and acid, and had the wine regularly till the 15th February. He was discharged well on the 8th March, with a well-formed stump.

No. 8.—*Disease of the foot of nearly ten years' standing; amputation; cure.*

N., Hindoo; Lohana; age 43; occupation freight broker; native of Lukput in Kutch; resident in Kurrachee for the last 10 years; disease of foot of 9½ years' duration; admitted 19th November 1859.

The right foot is absorbed in a globular swelling which extends in front from the lower part of the leg just above the ankle-joint to the arch of the foot, and measures three inches and a half. On the inner side it measures four inches and a half, and extends from a little above the ankle to within half an inch of the sole of the foot. Its circumference is thirteen inches. The skin in these parts is congested, bearing on the surface a number of sinuses, some of which are beset with prominent granulations, and allow a probe to pass in through the soft part till it is intercepted by the osseous tissue in the interior. A tolerably thick discharge escapes from some of these openings which, according to the patients' statements, contains granules at times. At the top of the foot just below the ankle-joint is a small fluctuating swelling. The skin over the heel at the insertion of the tendo-Achilles and the sides is white, like leprous patches (probably from cauterizing applications). The integuments of the sole of the foot, as well as the covering of the metatarsus and phalanges is healthy:—the line of demarcation between healthy and livid skin in front being just the line for Hey's operation.

He is an old man reduced from protracted illness. Has a small weak pulse; tongue clean; bowels said to be regular; no fever; chest found to be healthy on percussion and auscultation.

The patient gives the following clear history of his illness. He says, that, twelve years previous to the commencement of the foot disease, he had primary syphilis, of which he was cured in a short time. But in a year's time after it, he was seized with rheumatism which rendered him unable to move from his bed. He recovered from it on a return to his native land (Lukput) where his feet became œdematous. Six months after the subsidence of the œdema, now about nine and a half years ago, he observed a small hard swelling on the right heel near to the inner ankle. The swelling was small at first, but gradually attained the bulk of a mango. He had recourse to various remedies for the cure of the enlargement, and among them actual cautery was applied more than once, and he was profusely salivated about three years ago. Previous to the salivation, he had observed a small hole (sinus) of the size of a needle's eye in the skin over the tumour at the heel, which was incised by a hakim, and nothing but blood came out of it. During the last five years, the disease progressed very rapidly, more and more of the skin became livid, fresh sinuses appeared when attempts were made to heal over the old ones.

19*th November*.—At his own request, he was brought under the influence of chloroform, and flap amputation of the leg performed four inches below the tuberosity of the tibia. Four ligatures, including one in the muscular flap, and eight sutures were applied, and the stump covered with water dressing and lightly bandaged. About 6 oz. of blood lost during the operation, on completion of which a full opiate was administered. 6 P.M.—Says he feels great pain in the wound. Does not keep the stump at rest, the bandages are soaked in blood. ℞ mist. camphor ℥ii., tinct. opii. ♏ xl., ft. haust., H.S.

20*th*.—Has had no sleep in the night; is quiet, and keeps the stump carefully in its proper position; skin of the natural temperature; pulse small, easily compressed. He was discharged quite well on the 25th December 1859.

*Examination of the removed limb* 18 *hours after amputation*.—The swelling, lividity, and sinuses were seen as above described. The congested skin was thickened,—agglutinated to, and inseparable from, the subjacent areolar tissue. The fatty, muscular, and other tendonous parts were healthy in appearance. The superficial fluctuating swelling above mentioned discharged thick yellow pus on incision. On sawing through the tibia an inch above the ankle-joint, the medulla inside was seen softer and yellower than at its upper part, where it was reddish and comparatively hard. The soft parts of the foot were cut through and sawn into two halves. A great portion of the spongy texture of the section of the os calcis and astragalus presented an unusual vascular appearance inclined to livid. The tissue itself was hard to the touch of a knife, and not easily removable as usual in this peculiar disease. Below the edge of the inner malleolus but out of the joint, between the opposing

surfaces of the astragalus and os calcis, bound externally by the fleshy parts of the sole of the foot, was a purulent collection of the size of a walnut; the purulent matter was thick but not quite yellow, and without any appreciable granules. The lower part of the section of the calcaneum was yellowish and softish, and from it purulent matter was scraped out easily. The section of the astragalus was further sawn into two through its middle, and a small purulent collection of the size of a two-anna bit detected in the cancellated tissue immediately in contact with the cortical portion of the bone which articulates with the end of the tibia. A little matter was also seen attached to the sides of the saw. A minute soft globular substance resembling pus, but more concrete in appearance, was scooped out of the interior of the scaphoid bone when sawn through. The laminated tissue of all the tarsal and metatarsal bones was healthy. There was no softening of their textures as is usually met with. On passing a blow-pipe through the sinus at the heel in the inner half of the section, a dark hard piece of dry *date* came out. On inquiring of the patient, it was made out that he had applied date poultices some years ago, but was careful to remove all the hard pieces inside them. He also remembers that a sinus existed when the poultices were used. (The outer half of the section, as well as the separate bones of the inner half, and the piece of date, were forwarded to Professor H. Vandyke Carter of the Grant College Museum.)

*Remarks.* The disease, through long standing, progressed very slowly, as shown by the few pathological appearances described above. There was absence of any softening of the bones and of the granular yellow deposits seen in the first four cases. In the present instance we have morbid changes akin to those observed in case No. 5, only not so advanced as in the latter. The blackening of the cancellated texture was not so complete, and, instead of soft easily removable interior, it was hard to the touch of a knife. It is also similar to case No. 5, insomuch that the swelling and congestion of the skin were limited to the tarsus. It throws a new light on the etiology of this peculiar foot disease. It is interesting to inquire whether the poison of syphilis has anything to do with the causation of this peculiar disease. The patient now discharged had a strong belief that his disease was due to the previous attacks of syphilis, which is rendered probable by the caries of isolated portions of the scalp, as indicated by the appearance of depressed skin on the pericranium. The presence of dry date, as a foreign body, merely acted as an exciting cause, and by a slow inflammatory process led to the before-mentioned purulent collection.

# ANALYSIS OF THE MINERAL WATERS, &c., BOMBAY PRESIDENCY.

By H. GIRAUD, M.D. (Edin.), and R. HAINES, M.B. (Lond.)

Presented by Government.

1. The examination of Mineral Waters in the Bombay Presidency dates from about 1854. In the 1st volume of the Medical and Physical Society's Transactions, p. 257, an account of the hot springs in the Concan is furnished by Dr. Duncan, dated June 1837. In May 1851, Dr. Gibson brought the subject to the notice of the Bombay Branch of the Royal Asiatic Society, and, in September 1854, forwarded to the Medical Board a List of Mineral and Hot Springs known in this Presidency.

2. The following is a copy of portion of a letter from the Supreme Government on the subject, dated 28th July 1854, with directions for the collection of mineral waters:—

"No. 3285.

From the Secretary to the Government of India,

To the Chief Secretary to the Government of Bombay.

*Dated Fort William, the 28th July* 1854.

Foreign Department.

"Sir,—The Government of India being desirous that the waters of all the mineral springs throughout India and its dependencies should be simultaneously examined and reported upon, I am directed by the Most Noble the Governor General in Council to request, that, in furtherance of that object, the Right Honorable the Governor of Bombay in Council will forward to all Commissioners, or other superior Local Authorities within the Bombay Presidency, and to all Political Officers subordinate to the Bombay Government, a copy of the accompanying directions, which show how the specimens of the various mineral waters should be collected, and what information regarding the

places where they are found is required. I am desired to request that His Lordship in Council will instruct all such Civil or Political Officers to collect, or cause to be collected (in communication with the different Medical Officers), specimens of the waters of every mineral spring within their respective jurisdictions, and to forward them with the requisite information as soon as may be to the Secretary to the Medical Board at the Presidency.

"2. I am further directed to request, that His Lordship in Council will desire the Medical Board at Bombay to issue such instructions to all Officers subordinate to it, as shall ensure their zealous co-operation with the Civil and Political authorities in this matter.

"3. I am also to request that the Medical Board may be directed to make over the different specimens of waters, and the reports regarding them, as they are received, to the Professor of Chemistry at the Presidency, who should be instructed to effect a careful analysis of each specimen, and to report the result thereof to the Board.

"4. That authority, as it receives the reports of the Chemical Professor, should communicate them, and the information which has been furnished by the local authority, with any remarks they may have to make, to the Medical Board at Calcutta, to whom has been entrusted the duty of reporting on the mineral waters throughout India and its dependencies to the Government of India.

* * * * *

I have the honour to be, &c.

(Signed) G. F. Edmonstone,
Secretary to the Government of India."

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"*Directions for the Collection of Mineral Waters.*

"1*st*. The mineral water should be bottled in fine dry weather, and for gaseous waters the morning is best.

"2*nd*. Particulars should be sent of the quantity of water furnished by the spring,—its temperature,—whether varying much at different times,—the nature of the soil or of the rocks

from which it issues,—the supposed elevation above the level of the sea,—whether the spring contains bubbles of any gas,—whether any particular *confervæ* are found growing near it,—and whether the spring deposits any sediment.

"3*rd*. Four quart bottles of each water will be the quantity usually required : the bottles to be of common black glass, perfectly clean; the corks, if possible, new, and it is well to steep them for a few days in water of the spring. The corks to fit accurately, and to be secured with string in the usual way in which beer is bottled in this country; and the bottles, packed with tow, placed in a box with four divisions.

"4*th*. With sulphurous waters, it is particularly necessary that the bottle be quite full. Acidulous or alkaline gaseous waters may be exposed to the air for an instant before corked; and it is especially necessary to be careful in tying down the corks of such.

"5*th*. Specimens of any *confervæ* about the well, or of any deposits from it, as well as of the rocks in the neighbourhood, should also be sent.

"6*th*. A notice should accompany, stating whether the Natives of the country believe in the medicinal powers of the water, and in what diseases they count it useful.

"7*th*. There should be no delay in transmitting the water, which should be sent by Dâk Banghy to the address of the Secretary Medical Board.

"8*th*. Where Medical Officers, or others on the spot, are able to afford any chemical information respecting the waters, they should be requested to communicate it; especially in cases of gaseous waters, it is very desirable that they should endeavour to determine the quantity of gas present."

3. In accordance with the 4th paragraph of Mr. Edmonstone's letter, a copy of every analysis made by the Professor of Chemistry and Chemical Analyser was forwarded by the Medical Board, Bombay, to the Medical Board, Calcutta.

4. In a Despatch from the late Honorable Court, No. 58, dated 25th November 1857, it is stated (paragraph 15), "It appears that, in the six months previous to March 1855, Dr. Giraud had

analysed and reported on twenty-five specimens of Mineral Waters. These reports have not been furnished to us, and we have not been informed of any subsequent operations in respect to Mineral Waters. We desire to be furnished with reports of all the springs, the waters of which have been subject to examination."

5. In reply to this despatch, the Director-General Medical Department, reported to Government, by letter No. 473 of 20th February 1858, that, up to that date, the Chemical Analyser had examined other twenty-six specimens since March 1855, and that copies of the analyses were regularly forwarded to Calcutta, as previously ordered.

6. In July 1858, by letter No. 83, the Bengal Government forwarded reports of Drs. Giraud and Haines on the Mineral Waters in the Bombay Presidency, in compliance with Court's orders of November 1857.

7. The Right Honorable the Secretary of State for India, in paragraph 16, of Despatch No. 63 of 16th June 1859, observed "It is desirable that these reports should be made generally known to the medical officers throughout the Bombay Presidency, in order that the efficacy of the springs, in cases of disease, may be tested, as occasions offer."

8. The Right Honorable the Governor in Council approved of Dr. Haines, the present Acting Chemical Analyser, undertaking the preparation of the Tables, and directed that copies should be furnished to every medical officer as ordered by the Home Government.

## TABLE A.

*Composition of the Waters of the Mineral Springs of the Bombay Presidency.—In* 10,000 *parts or grain measures.*

| Locality. | Mineral Springs in the Concan. | | | | |
|---|---|---|---|---|---|
| | 1<br>Arrowlee (Rutnagherry).<br>G. * | 2<br>Kokneer (Tanna).<br>H. † | 3<br>Oonara Furrara (Rutnagherry).<br>G. | 4<br>Palee (Tanna).<br>G. | 5<br>Rajapore (Rutnagherry), Intermitting Spring.<br>G. |
| Date of Collection. | Jan. 1855. | Feb. 1856. | Nov. 1854. | Dec. 1854. | June 1855. |
| Temperature at Source (Fahr.) | [Hot] | [Hot] | 157° | 108° | [Cold.] |
| Specific gravity at 60°. | 1000·5 | 1006·4 | 1001·0 | 10020 | 1000·0 |
| Chloride of Sodium | (x) | 27·78 | 12·83 | 11·01 | a little |
| ,, Magnesium | .... | ·39 | .. . | .... | .... |
| ,, Calcium | (x) | 50·03 | 4·17 | 13·28 | .... |
| Sulphate of Soda | .... | .... | .... | .... | .... |
| ,, Lime | (x) | 1·89 | 1·59 | 1·43 | a little |
| Nitrate of Magnesia | .... | .... | .... | .... | .... |
| ,, Lime | .... | a trace | .... | .... | .... |
| Carbonate of Soda | .... | .... | .... | .... | .... |
| ,, Magnesia | .... | .... | .... | .... | .... |
| ,, Lime | .... | .... | .... | .... | .... |
| Silica | .... | ·36 | ·47 | ·33 | .... |
| Total Solids.... | 4·9 | 80·45 | 19·06 | 26·05 | Quantity trifling. |
| Gaseous contents.... | .... | .... | .... | Much gas given off at the spring. | .... |

* Analysed by Dr. Giraud.

† Analysed by Mr. Haines.

TABLE A.—*continued.*

| Locality. | Mineral Springs in the Concan. | | | | | |
|---|---|---|---|---|---|---|
| | 6<br>Rajapore (Rutnagherry) Hot Spring.<br>G. | 7<br>Sáo (Tanna).<br>G. | 8<br>Satiwallee (Tanna).<br>G. | 9<br>Sungmeshwur (Rutnagherry) Spring in the bed of the river.<br>G. | 10<br>Toorul (Rutnagherry)<br>G. | 11<br>Wuzeerabye (Tanna).<br>G. |
| Date of Collection. | Dec. 1854. | Dec. 1854. | Oct. 1855. | Jan. 1855. | Jan. 1855. | Jan. 1855. |
| Temperature at Source (Fahr.) | 105° | 108° | [ Hot. ] | [Warm.] | [About 110°] | 120° |
| Specific gravity at 60°. | 1000·5 | 1001·0 | .... | 1000·0 | 1001·5 | 1002·0 |
| Chloride of Sodium ..... | a little | (*x*) | A saline water. Not supplied in a state suitable for analysis. | .... | (*x*) | 12·41 |
| ,, Magnesium ..... | .... | .... | | .... | .... | .... |
| ,, Calcium ..... | .... | (*x*) | | .... | (*x*) | 7·07 |
| Sulphate of Soda ..... | .... | .... | | .... | .... | .... |
| ,, Lime ..... | a trace | (*x*) | | .... | (*x*) | 2·08 |
| Nitrate of Magnesia ..... | .... | .... | | .... | .... | .... |
| ,, Lime ..... | .... | .... | | .... | .... | .... |
| Carbonate of Soda ..... | .... | .... | | .... | .... | .... |
| ,, Magnesia ..... | .... | .... | | .... | .... | .... |
| ,, Lime ..... | .... | .... | | .... | .... | .... |
| Silica ..... | .... | .... | | .... | .... | ·88 |
| Total Solids.... | (*x*) | 11·4 | .... | 1·3 | 9·6 | 22·64 |
| Gaseous contents.... | .... | Much gas at the spring. | .... | .... | .... | .... |

TABLE A.—*continued.*

| Locality. | Mineral Springs in the Deccan. | | | | |
|---|---|---|---|---|---|
| | 12 Arawud (Khandeish), Spring called "Oonoopdew." G. | 13 Gungee Bawee (Belgaum). G. | 14 Haweree (Belgaum). G. | 15 Khairpara (Khandeish). G. | 16 Lin Khool (Sattara). G. |
| Date of Collection. | Sept. 1854. | Feb. 1855. | Feb. 1855. | Aug. 1855. | Mar. 1855. |
| Temperature at Source (Fahr.) | 139° | [Cold.] | ? | About 98° | [Tepid.] |
| Specific gravity at 60°. | 1000·5 | 1000·0 | 1004·0 | 1000·0 | 1000·5 |
| Chloride of Sodium | (*x*) | (*x*) | 11·54 | .... | .... |
| ,, Magnesium | .... | .... | 12·68 | .... | .... |
| ,, Calcium | (*x*) | (*x*) | .... | .... | .... |
| Sulphate of Soda | .... | .... | 1·54 | .... | .... |
| ,, Lime | .... | .... | 6·48 | .... | .... |
| Nitrate of Magnesia | .... | .... | .... | .... | .... |
| ,, Lime | .... | .... | .... | .... | .... |
| Carbonate of Soda | .... | .... | .... | .... | .... |
| ,, Magnesia | .... | .... | .... | .... | .... |
| ,, Lime | .... | .... | 12·24 | .... | .... |
| Silica | .... | .... | ·37 | .... | .... |
| Total solids | 2·4 | 1·4 | 44·85 | Quantity trifling. | 4·0 |
| Gaseous contents | .... | .... | .... | .... | .... |

TABLE A.—*continued.*

| Locality. | Mineral Springs in Guzerat. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 17 Dewkee Oomajee (Surat). G. | 18 Kawa (Broach). G. | 19 Hursole (Ahmedabad) G. | 20 Lussoondra (Kaira). G. | 21 Towa Kakunpoora (Scindia). G. | 22 Towa near Godra (Scindia). G. | 23 Toolsee Kattiawar. G. |
| Date of Collection. | Apr. 1855. | Sept. 1854. | Oct. 1857. | Sept. 1854. | Sept. 1854. | May 1858. | May 1855. |
| Temperature at Source (Fahr.) | [Hot.] | [Cold.] | ? | 124° | [Hot.] | ? | [Hot.] |
| Specific gravity at 60°. | 1001·0 | 1001·0 | 1001·5 | 1004·0 | 1003·0 | 1004·0 | 1001·0 |
| Chloride of Sodium..... | 8·46 | 6·74 | 8·45 | 42·35 | 36·69 | 28·59 | 7·92 |
| ,, Magnesium .... | .... | .... | .... | .... | .... | .... | .... |
| ,, Calcium ..... | .... | .... | .... | 14·53 | 7·19 | 12·48 | .... |
| Sulphate of Soda..... | .... | 2·04 | .... | .... | .... | .... | 1·13 |
| ,, Lime ..... | 1·64 | .... | 1·07 | 3·88 | 3·82 | 3·83 | ·41 |
| Nitrate of Magnesia..... | .... | .... | .... | .... | .... | .... | .... |
| ,, Lime ..... | .... | .... | .... | .... | .... | .... | .... |
| Carbonate of Soda ..... | 1·86 | 1·94 | 1·52 | .... | .... | .... | .... |
| ,, Magnesia .... | .... | 1·58 | ·54 | .... | .... | .... | .... |
| ,, Lime ..... | ·15 | ·57 | 1·98 | .... | .... | .... | 1·33 |
| Silica ..... | ·68 | ·47 | ·28 | .... | a trace | ·60 | 1·08 |
| Total solids.... | 12·79 | 13·34 | 13·84 | 60·76 | 47·70 | 45·50 | 11·87 |
| Gaseous contents.... | Sulph. Hydrgn. 4·61 cub. ins. | .... | .... | .... | .... | .... | .... |

TABLE A.—*continued.*

| Locality. | Mineral Springs in Sind. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 24 Hinglaz (Beila). G. | 25 Jein Peer. G. | Mugger Peer. 26 Hajee Monga Spring. G. | 27 Hajee Mouza Spring. G. | 28 Lalshabag Spring. G. | 29 Thang. G. | 30 Wagodur. G. |
| Date of Collection. | Oct. 1854. | Oct. 1854. | Oct. 1854. | Oct. 1854. | Oct. 1854. | Oct. 1854. | Oct. 1854. |
| Temperature at Source (Fahr.) | ? | [Hot.] | 100° | 130° | 107° | ? | ? |
| Specific gravity at 60°. | 1001·0 | 1002·0 | 1001·0 | 1001·0 | 1001·0 | 1001·0 | 1003·0 |
| Chloride of Sodium | .... | 11·56 | .... | 6·64 | .... | .... | 10·44 |
| ,, Magnesium | .... | .... | .... | ·65 | .... | .... | 5·04 |
| ,, Calcium | .... | .... | .... | .... | .... | .... | .... |
| Sulphate of Soda | .... | 2·02 | .... | 1·37 | .... | .... | 5·58 |
| ,, Lime | .... | .... | .... | 1·76 | .... | .... | .... |
| Nitrate of Magnesia | .... | .... | .... | .... | .... | .... | .... |
| ,, Lime | .... | .... | .... | .... | .... | .... | .... |
| Carbonate of Soda | .... | 2·11 | .... | .... | .... | .... | .... |
| ,, Magnesia | .... | .... | .... | .... | .... | .... | ·35 |
| ,, Lime | .... | 2·17 | .... | .... | .... | .... | ·93 |
| Silica | .... | ·48 | .... | ·08 | .... | .... | ·18 |
| Total solids | 7·2 | 18·34 | 13·0 | 10·50 | 13·0 | 7·5 | 22·77 |
| Gaseous contents | .... | .... | .... | .... | .... | .... | .... |

## TABLE B.

*Composition of various Well and River Waters in the Bombay Presidency.—In* 10,000 *parts or grain measures.*

| Locality. | Wells at Aden. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 Banian Well. H. | 2 Parsee Well. H. | 3 Turkish Wall Well. H. | 4 Jaffron Well. H. | 5 Lower Tawella Well. H. | 6 Jail Well. G. | 7 Bir-ud-Dowla. G. |
| Date of Collection. | 1851. | 1851. | 1851. | 1851. | 1851. | 1847. | 1847. |
| Specific gravity at 60°. | 1007·2 | 1005·2 | 1005·1 | 1007·9 | 1004·4 | 1004·0 | 1002·0 |
| Chloride of Sodium ..... | 32·93 | 29·80 | 30·88 | 49·18 | 19·63 | .... | .... |
| ,, Magnesium .. | 10·11 | 11·50 | 10·97 | 14·43 | 6·35 | .... | .... |
| ,, Calcium ..... | 14·75 | 13·29 | 11·05 | 9·51 | 15·96 | .... | .... |
| Sulphate of Soda ..... | 13·69 | 7·62 | 8·40 | 15·25 | 5·63 | .... | .... |
| ,, Magnesia .... | .... | .... | .... | .... | .... | .... | .... |
| ,, Lime ..... | .... | .... | .... | .... | .... | .... | .... |
| Nitrate of Magnesia ..... | .... | .... | .... | .... | .... | .... | .... |
| ,, Lime ..... | 14·09 | 5·23 | 4·50 | 9·89 | .... | .... | .... |
| Carbonate of Magnesia .. | ·35 | ·31 | ·40 | ·45 | ·51 | .... | .... |
| ,, Lime ..... | | | | | | | |
| Silica..... | ·53 | ·31 | ·45 | ·38 | ·60 | .... | .... |
| Organic matter in solution. | .... | .... | .... | .... | .... | .... | .... |
| ,, suspended ..... | .... | .... | .... | .... | .... | .... | .... |
| Total solids.... | 86·45 | 68·06 | 66·65 | 99·09 | 48·68 | 27·90 | 7·5 |
| Gaseous contents.... | Carb. acid ·55 c.i. | 1·36 | 1·10 | ·55 | ·95 | .... | .... |

TABLE B.—*continued.*

| Locality. | Wells at Nassik. | | Rivers in the Deccan. | |
|---|---|---|---|---|
| | 8<br>Bhuder Kalee Well.<br>G. | 9<br>Jail Well.<br>G. | 10<br>Doné River.<br>H. | 11<br>Krishna River. The "Poison Pool," near Munknee.<br>G. |
| Date of Collection. | Oct. 1855. | Nov. 1854. | Feb. 1856. | Apr. 1855. |
| Specific gravity at 60°. | 1004·0 | 1002·0 | 1006·0 | 1015·0 |
| Chloride of Sodium | 19·97 | 8·42 | 37·70 | 41·74 |
| ,, Magnesium | .... | .... | .... | .... |
| ,, Calcium | .... | .... | .... | .... |
| Sulphate of Soda | .... | .... | ·37 | 69·66 |
| ,, Magnesia | .... | .... | 16·99 | 4·02 |
| ,, Lime | 6·88 | 1·71 | 13·55 | ·21 |
| Nitrate of Magnesia | 19·63 | 12·28 | .... | .... |
| ,, Lime | 12·90 | 9·60 | .... | .... |
| Carbonate of Magnesia | .... | .... | } ·99 { | 11·29 |
| ,, Lime | .... | .... | | .... |
| Silica | 3·26 | .... | ·10 | ·51 |
| Organic matter in solution | .... | .... | .... | .... |
| ,, suspended | .... | .... | .... | .... |
| Total solids | 62·64 | 32·70 | 69·70 | 127·42 |
| Gaseous contents | .... | .... | .... | .... |

TABLE B.—*continued.*

| Locality. | | Waters at Poona. | | | |
|---|---|---|---|---|---|
| | | Moota River at the City Bund. | | | |
| | | 12 G. | 13 H. | 14 H. | 15 H. |
| Date of Collection. | | Oct. 1855. | Jan. 1856. | Mar. 1856. | May 1856. |
| Specific gravity at 60°. | | 1000·0 | 1000·4 | 1000·6 | 1000·9 |
| Chloride of Sodium | Inorganic constituents. | (x) | (x) | 5·95 | 6·90 |
| ,, Magnesium | | | | | |
| ,, Lime | | | | | |
| Sulphate of Soda | | | | | |
| ,, Magnesia | | | | | |
| ,, Lime | | | | | |
| Nitrate of Magnesia | | | | | |
| ,, Lime | | | | | |
| Carbonate of Magnesia | | | | | |
| ,, Lime | | | | | |
| Silica | | | | | |
| Organic matter in solution | | (x) | (x) | 1·61 | 1·69 |
| ,, suspended | | .... | .... | 1·90 | 14·29 |
| Total solids | | 1·1 | 6·34 | 9·46 | 22·88 |
| Gaseous contents | | .... | .... | .... | .... |

TABLE B.—*continued.*

| Locality. | | Waters at Poona. | | | | |
|---|---|---|---|---|---|---|
| | | Moota Moola River at the Jamsetjee Bund. | | | | 20 Jamsetjee fountain in Camp. |
| | | 16 G. | 17 H. | 18 H. | 19 H. | H. |
| Date of Collection. | | Oct. 1855. | Jan. 1856. | Mar. 1856. | May 1856 | May 1856. |
| Specific gravity at 60°. | | 1000·0 | 1000·4 | 1000·25 | 1000·5 | 1000·3 |
| Chloride of Sodium | Inorganic constituents. | (x) | 2·97 | 2·05 | 2·10 | 1·66 |
| ,, Magnesium | | | | | | |
| ,, Lime | | | | | | |
| Sulphate of Soda | | | | | | |
| ,, Magnesia | | | | | | |
| ,, Lime | | | | | | |
| Nitrate of Magnesia | | | | | | |
| ,, Lime | | | | | | |
| Carbonate of Magnesia | | | | | | |
| ,, Lime | | | | | | |
| Silica | | | | | | |
| Organic matter in solution | | (x) | ·59 | ·59 | ·85 | ·68 |
| ,, suspended | | .... | .... | a trace | 1·05 | ·14 |
| Total solids | | 1·2 | 3·56 | 2·64 | 4·00 | 2·48 |
| Gaseous contents | | .... | .... | .... | .... | .... |

TABLE B.—*continued.*

| Locality. | Waters at Kurrachee (selected). | | | | |
|---|---|---|---|---|---|
| | 21<br>Bed of the Lyaree river.<br>H. | 22<br>Camp Water Company's well near Government Gardens.<br>H. | 23<br>Well on the Bunder Road, in front of Messrs. Warwick and Waller's premises.<br>H. | 24<br>Well on the Bunder Road, near Muchee Meanee.<br>H. | 25<br>Well in the Rutton Tank.<br>H. |
| Date of Collection. | June 1859. | June 1859. | June 1859. | June 1859. | June 1859. |
| Specific gravity at 60°. | 1000·4 | 1000·9 | 1006·6 | 1037·8 | 1001·4 |
| Chloride of Sodium | 2·35 | 8·12 | 58·20 | 423·75 | 9·41 |
| ,, Magnesium | ·02 | .... | .... | .... | .... |
| ,, Calcium | ·66 | .... | .... | .... | .... |
| Sulphate of Soda | .... | ·78 | 4·34 | 43·73 | 2·02 |
| ,, Magnesia | .... | ·05 | 6·61 | 76·85 | ·02 |
| ,, Lime | ·53 | ·69 | ·44 | 12·04 | ·45 |
| Nitrate of Magnesia | .... | .... | .... | .... | .... |
| ,, Lime | .... | .... | .... | .... | .... |
| Carbonate of Magnesia | ·04 | ·38 | 1·09 | 2·91 | ·95 |
| ,, Lime | ·55 | ·96 | 2·37 | 2·37 | 1·26 |
| Silica | (*x*) | (*x*) | (*x*) | (*x*) | (*x*) |
| Organic matter in solution | .... | .... | .... | .... | .... |
| ,, suspended | .... | .... | .... | .... | .... |
| Total solids | 4·15 | 10·98 | 73·05 | 561·65 | 14·11 |
| Gaseous contents | .... | .... | .... | .... | .... |

*Remarks on the above waters in* TABLE A., *drawn chiefly from the Reports which accompanied them.*

No. 1. The Village of *Arrowlee* is 12 miles due north of *Sungmeshwur*. Into a small reservoir, are said to flow from its bed, three hot and two cold springs. The temperature of the hot springs is about 70° (probably a clerical error). There is no bubbling of gas at the spring, but the water at its source smells slightly of sulphur. The hot springs are estimated to furnish one gallon per minute. The springs arise from trap rock.

No. 2. *Kokneer* is in the talooka of *Mahim*. There are several springs, which flow from the rocks in the steep bank of the *Soorya* river into basins hewn for their reception. The water is as warm as can be well borne by the hand. The natives attribute no medicinal qualities to it. The rock is trap.

No. 3. The "*Oonara Furrara*" spring is about 14 miles from the station of *Dapoolie;* it gushes out near the side of a creek. The water is stated to have a strong sulphurous odour, but no gas is evolved with it.

No. 4. The village of *Palee* is in the *Nagotna* petta of the *Sanksee* talooka, but it belongs to the Punt Suchew. The spring is a mile from the village. Bubbles of gas of unpleasant odour are given off at the spring. It is in repute for its supposed efficacy in skin diseases, and paralysis (probably rheumatism) of the extremities.

No. 5. *Rajapore* is situated at the head of a tidal creek south of *Rutnagherry*, and about 10 miles from the sea. The intermitting spring is about a mile from the hot spring. Its circumstances are interesting. The water makes its appearance only at uncertain times, never more than once a year, sometimes only once in two years; when it once commences, it generally flows for two or three months. The usual season of its flow is in the hot months, rarely or never in the monsoon: it suddenly commences and as suddenly stops. From this peculiarity the spring is held in great reverence, and is called the "sacred Gunga" (Ganges). Immediately the spring begins to flow, the natives from a long distance round resort to it, and bathe in the water, and it is frequented the whole time it continues to flow. A number of

small tanks have been constructed for the use of the bathers. The cause of the intermission is altogether unknown.

No. 6. The hot spring at *Rajapore* is in the side of a hill two miles from the town, close to the stream which feeds the creek. It discharges about 1½ gallons per minute. The hills at the spot and around are formed of laterite.

No. 7. The village of *Sao* is in the *Raeghur* talooka, not far from *Dasgaon*. There are three springs near to each other, and to the *Savitree* river. The water, when it first issues, has a sulphurous—but not strongly marked—odour. The geological formation is trap.

No. 8. *Sativallee* is in the talooka of *Mahim*, about 4 miles from *Kokneer* (No. 3.)

No. 9. *Sungmeshwur* is a large town at the head of a tidal creek. The hot springs are found in the middle of a fresh-water rivulet three miles from the town; they are only perceptible when the water in the stream is low. The water is not very hot; it gives off some bubbles of gas smelling of sulphur. In the water analysed, the water of the spring was probably mixed with that of the stream. The formation is trap.

No. 10. *Toorul* is a village 7 miles north of *Sungmeshwur*. The spring rises in black trap rock near a small rivulet, and yields about 1½ gallons per minute; bubbles of gas, smelling of sulphur, are given off from the water.

No. 11. *Wuzeerabye* is in the talooka of *Bhewndee*. The thermal springs in its neighbourhood are very numerous, not less than nine in number. Several of them rise in the bed of the river. The temperature ranges from 110° to 136°; bubbles of gas of strong sulphurous odour issue with the water. The most copious spring,—that of which the analysis was made,—yields about 12 gallons a minute. Temples have been built near the springs and bathing tanks; they are much resorted to. The chief effect attributed by the natives to the water when used for bathing, is the production of a voracious appetite.

No. 12. The town of *Arawud* is in the talooka of *Chopra*, in the north of *Khandeish*, within two or three miles of the nearest hills of the *Satpoora* range. There are several springs

near each other. The soil is said to be black earth and "moorum," probably resting on trap. The springs are named after various local gods; that of *Oonoopdeo* is the only one in much repute. The fresh water has a peculiar, but not sulphurous odour; it is not reported to yield any gas. Bathing tanks are constructed near the spring, which is in repute for the cure of cutaneous diseases.

No. 13. "*Gungee Bawee*" is the name of a spring near the village of *Hydrabad* in the *Bunkapoor* talooka. No particulars have been furnished.

No. 14. *Haweree* is in the same talooka. The water is considered to possess a peculiarly cleansing character.

No. 15. *Khairpara* is in the *Achchranee* Purgunnah of the *Sultanpoor* talooka, near the base of the *Satpoora* hills. The water gushes from the rock, which is probably trap.

No. 16. The "*Lin Khool*" spring issues from a hill near the village of *Botha*, in the *Mallowree* mahal of the *Kutao* talooka. The rock is "moorum" (decomposed trap). The spring yields no gas. The water is popularly considered to be a remedy for the small-pox.

No. 17. The *Dewkee Oomajee* spring is 30 kos, or 60 miles from *Surat*, but in what direction is not stated. There are several springs, whose waters mingle in a reservoir, and which yield an aggregate of above two cubic feet per minute. Bubbles of gas of sulphurous odour are given off at the source. The water is not much used.

No. 18. *Kawa* is in the *Jumboseer* Purgunna. The water is that of a well (?), nearly upon the sea level. The soil is sandy and alluvial, and yields an efflorescence containing carbonate of soda. No gas issues with the water. It is considered in the country to be a specific preventive of hydrophobia.

No. 19. *Hursole* is a large town 30 miles north-east of *Ahmedabad*. The spring is said to be (or to appear) warm during the night and cool during the day; possibly the water is of a nearly constant temperature of 80° or 90°, and the variation only apparent, but it is nevertheless certain that variations of this kind do really occur in some of these springs. The water

is said to have a peculiar taste, and to be very efficacious in certain cases of disease.

No. 20. *Lussoondra* is a village 12 miles from the district town of *Kupperwunj*. Wells are built round the springs, which are in the bed of a watercourse. The temperature is said to rise higher in the evening than in the morning. The neighbouring soil throws up much saline efflorescence, believed to contain carbonate of soda. The springs are not considered by the natives to possess any medicinal powers, but they are venerated, and a temple is built close to them.

No. 21. *Towa* is near the town of *Kakunpoora* in the *Godra* district belonging to Scindia, adjacent to the *Kaira* collectorate. The springs ooze up and form a kind of marsh, near which is a temple. In the marshy soil the pilgrims visiting the place have sunk a great number of large earthen pots, in which the water collects. The water in some of the pots is said to be much hotter than at *Lussoondra* (No. 20 above). Bubbles of gas are discharged with the water.

No. 22. *Towa.* This appears to be another village of the same name in the same district. The water analysed is that of one of a number of hot springs in the neighbourhood. It is situated in the sandy bed of a river, and is only discovered by removing the surface sand. Its temperature is not stated; it evolves no gas.

No. 23. The hot spring of *Toolsee* is situated in the *Gheer* hills, in the *Joonaghur* district. No medicinal efficacy is attributed to the water.

No. 24. *Hinglaz* is in the country of *Lus*, subject to the chief of *Beila*, near the coast to the west of *Lower Sind*. It is noted for the remarkable collection of mud volcanoes in its neighbourhood,—these have been described by Captain Robertson in the Transactions of the Geographical Societies of London and Bombay. It is not stated whether the water sent for analysis was obtained from one of the volcanoes or from a spring.

No. 25. The spring of *Jein Peer* is at the base of the *Lukkee hills*, 20 miles east of *Jerruck* in *Lower Sind*. The rock is nummulitic limestone.

Nos. 26 to 28. *Mugger Peer* is about 10 miles north of *Kurrachee*. The springs are found in a small valley in the midst of a range of hills of nummulitic and coralline limestone. The *Hajee Monga* spring is the most copious, and its waters form a kind of large shallow pond studded with islets, in which are kept a great number of alligators (mugger). All the waters, when fresh, are reported to have a styptic taste, and probably in that state do contain a small impregnation of iron, although when the specimens reached Bombay no iron could be detected in them, —it had perhaps all become precipitated by the action of the air. A few bubbles of gas are given off by the *Hajee Mouza* spring. The waters are much used for bathing in, and are held in great estimation for the cure of rheumatism, leprosy, and skin diseases.

No. 29. *Thang* is said to be a hilly tract of country, but in what part of *Sind* is not stated.

No. 30. *Wagodur* is near *Kurrachee;* no particulars have been furnished.

Besides the springs indicated in the table, accounts have been given of some others as existing within the limits of the Presidency, but no supplies of water from them have been received by the Chemical Analyser. It is, however, possible that some of them may be included, under different names, among those in the Table. I may here mention what is known of them, chiefly from descriptions given by Dr. Gibson.

Near *Sehwan* in *Sind*, in a gorge of the *Lukhee* hills, are some hot springs said to vary much in temperature, and to be saline and sulphurous.

In the *Mahim* talooka of the collectorate of *Tanna*, at the village of *Kobineera*, under the eastern face of the hill fort of *Kaldroog*, is a spring having a temperature of 130°.

In the same collectorate and talooka, near the village of *Tookmookh* is a hot spring.

In the same collectorate in the *Bassein* talooka, at *Vehlolee* near *Dysur*, is a hot spring.

In the *Rutnagherry* collectorate, in the *Sungmeshwur* district, in the neighbourhood of *Makjan*, are numerous hot springs.

(Those of *Arrowlee* and *Toorul*, Nos 1 and 10, Table A., are probably some of these.)

In the same collectorate, about a mile from the town of *Khed*, 16 miles south-east of *Dapoolee*, is a hot spring of tasteless water, temperature apparently about 100° ; seen by myself.

At *Trimbuck*, near the source of the *Godavery*, in the *Nassik* district, a sulphurous spring is stated, on the authority of the late Dr. Heddle, to exist.

At *Oonye* in the *Surat* zilla, situation undescribed, is a hot spring, said by the natives to have the very curious property of becoming sufficiently cool for bathing in during three days of the full moon in April. From a thermometric register kept during the three days succeeding the full moon in April 1834 by S. S. Law, Esq., late of the Bombay Civil service, it appears that the temperature at 5 A. M. rose from 116° on the first day to 122° on the third, and in the evening from 94° the first day to 124° on the third, thus showing a remarkable variation not only from day to day, but from hour to hour; but how far the variation is connected with the lunar periods, and whether it occurs especially in the month of April, there is no evidence to show. It is a question worthy of being set at rest by a series of trustworthy observations. Variability of temperature has been observed in many other hot springs in this part of India.

No water has been received from a sulphurous well, said to exist near *Somnath*, nor from some saline and sulphurous springs said to be found within high-water mark on the east of *Kattywar*.

### *Remarks to* Table B.

Nos. 1 to 7. The analyses in the Table indicate the composition of the water of the wells which form the chief source of water supply to the population of *Aden*. The amount of saline impregnation appears to vary, according as the rain-fall has been copious and recent, or otherwise; and as oftentimes rain does not fall for many months together, and then comes down in heavy showers of short duration, this variation may be considerable. The average fall at the place is only 3½ inches a year. The waters are remarkable for the very large proportion of lime

and magnesia salts which they contain, and also for the presence of nitrates in unusual quantity. The soil consists of volcanic scoriæ, the wells being all situated within the limits of an extinct volcanic crater.

Nos. 8 and 9. These wells are in the town of *Nassik*. They also are both remarkable for the presence of nitrates in large quantity; they are not used for drinking. The rock is trap.

No. 10. The *Doné* river rises in the eastern part of the province of *Sattara* and flows in a south-east direction, by *Beejapoor* and *Talikote*, into the *Krishna*. After the surface water of the monsoon has flowed off, the water is quite salt, hence the river is marked in some maps as a salt-water river.

No. 11. The "*Poison Pool*" is a deep part of the river *Krishna*, near the village of *Munknee* in the talooka of *Bagulkote*. Its saline character is only perceptible when the river is low. The water is supposed to be fatal to cattle and goats when drunk for any length of time; when used for bathing, it is considered beneficial in cases of skin disease. There appears to be a spring in the bed of the river at this spot.

Nos. 12 to 20. These waters were examined at the instance of Government. The city of *Poona* is supplied chiefly from some springs in the neighbouring hills, the water of which is conveyed by conduits into the public fountains; in the lower part of the town, the water of the river *Moota*, which flows by it, is used for some purposes. A quarter of a mile below the city, the *Moota* is joined by the *Moola* river, and a mile or two below the confluence the Jamsetjee bund stretches across the river and retains the water to a permanent depth of 10 or 12 feet. From the ponded water just above the bund, the cantonment and its bazar are supplied by force pumps and iron pipes. Most of the sewage of the city makes its way into the *Moota* river near the city bund or bridge; but as the flow of water through this river in the dry season is inconsiderable, the water at the Jamsetjee bund is mainly supplied by the *Moola*. Thus, notwithstanding the situation of this bund below the city, the water there participates less than might be expected in the impurities of the river as it passes the city. The influence of the dry

season, and the consequently diminishing flow of fresh water, is indicated in the Table by the progressive increase in the impurities from October to May.

Nos. 21 to 25. These waters are some out of 19 specimens taken from all the wells and tanks in use at *Kurrachee*. The difference in the quality of the water is extreme; Nos. 21, 22, and 25, are fair drinkable waters; in No. 23 there is a large impregnation of common salt; and in No. 24 the saline matter is present in enormous quantity;—the water is a strong brine, twice as salt as sea-water.

*Table of Cases of Lithotomy performed in the Civil Hosp. Hyderabad,*

| No. | Names. | Age. | Caste. | Sex. | Occupation. | Duration of Dis. | Admissions. |
|---|---|---|---|---|---|---|---|
| | | ys. | | | | Yrs. | 1859 |
| 1 | Naroo Ramdass .. | 4½ | Hindoo ... | Male.. | Banian .... | 2 | 5 Jan. |
| *2 | Nubboo Penel .... | 8 | Mussulman. | ,, | Labourer .. | 3½ | 11 ,, |
| 3 | Futta Ally. ..... | 6 | ,, | ,, | ,, | 2½ | 28 Feb. |
| 4 | Poosena ..... | 34 | Sweeper .. | ,, | ,, | 11 | 28 Feb. |
| 5 | Muttaree Saha .. | 18 | Mussulman. | ,, | Syed ..... | 7 | 2 Mar. |
| 6 | Hayat ..... | 22 | ,, | ,, | Labourer .. | 9 | 6 ,, |
| 7 | Fojio ..... | 20 | ,, | ,, | ,, | 13 | 6 ,, |
| 8 | Hajee ..... | 60 | ,, | ,, | ,, | 13 | 6 ,, |
| 9 | Ruheem Dad .... | 60 | ,, | ,, | ,, | 7 | 6 ,, |
| 10 | Ebhrahim ..... | 6 | ,, | ,, | ,, | 2 | 15 ,, |
| 11 | Munghun Sungut. | 6 | Hindoo ... | ,, | Banian .... | 2 | 15 ,, |
| 12 | Fuckeer Mohamed. | 8 | Mussulman | ,, | Labourer .. | 3 | 20 ,, |
| 13 | Gohoram Goolser.. | 8 | ,, | ,, | ,, | 2 | 22 ,, |
| 14 | Buska Moorad.... | 20 | ,, | ,, | ,, | 9 | 22 ,, |
| 15 | Goolam Syed Khan. | 55 | ,, | ,, | ,, | 4 | 1 Apr. |
| 16 | Lamoong Gedooro. | 6 | ,, | ,, | ,, | 1½ | 4 ,, |
| 17 | Dachund ..... | 12 | Hindoo ... | ,, | Mochee.... | 3 | 11 ,, |
| 18 | Moorid Gohur.... | 25 | Mussulman. | ,, | Labourer .. | 6 | 16 ,, |
| 19 | Jooma ..... | 32 | ,, | ,, | ,, | 9 | 13 May |
| 20 | Fojio ..... | 22 | ,, | ,, | ,, | 3 | 22 ,, |
| 21 | Choota Adum .... | 38 | ,, | ,, | ,, | 13 | 16 ,, |
| 22 | Alloo Rajoo ..... | 12 | Hindoo.... | ,, | Banian .... | 18Ms. | 18 June |
| 23 | Vurrind Harjee .. | 16 | ,, | ,, | ,, | 4Ys. | 20 ,, |
| 24 | Munghoo Nubeeb. | 38 | Mussulman. | ,, | Labourer .. | 9 | 21 ,, |
| 25 | Jeboo Assoo .... | 32 | ,, | ,, | ,, | 11 | 6 July |
| 26 | Chunio Hajee .... | 5 | ,, | ,, | ,, | 2 | 14 ,, |
| 27 | Dosoo Shemboo .. | 35 | ,, | ,, | ,, | 14 | 19 ,, |
| 28 | Oobhaio ..... | 30 | ,, | ,, | ,, | 8 | 20 ,, |
| 29 | Alla Vattia ..... | 45 | ,, | ,, | ,, | 12 | 6 Aug. |
| 30 | Preetum ..... | 38 | Hindoo.... | ,, | Banian .... | 13 | 10 ,, |
| 31 | Buchio..... | 12 | ,, | ,, | ,, | 4 | 26 ,, |
| 32 | Sucheno ..... | 50 | Mussulman. | ,, | Labourer .. | 7 | 26 ,, |
| 33 | Assooda ..... | 12 | Hindoo.... | ,, | Banian .... | 2½ | 23 Sept. |
| 34 | Soomro ..... | 13 | Mussulman. | ,, | Labourer .. | 3 | 23 ,, |
| 35 | Dhunee bux ..... | 20 | ,, | ,, | ,, | 5 | 1 Oct. |
| 36 | Hakeem Khan.... | 8 | ,, | ,, | ,, | 14Ms. | 24 ,, |
| 37 | Peroj ..... | 2 | ,, | ,, | ,, | 10Ms. | 1 Nov. |
| 38 | Meherna ..... | 20 | Hindoo ... | ,, | Carpenter.. | 2½Ys | 1 ,, |
| 39 | Bahadoor..... | 26 | Mussulman. | ,, | Labourer .. | 8 | 10 ,, |
| 40 | Kessur..... | 3 | ,, | ,, | ,, | 9Ms. | 15 ,, |
| 41 | Manoo Khan .... | 26 | ,, | ,, | ,, | 3 Ys. | 10 Dec. |
| 42 | Mudut Ally..... | 8 | ,, | ,, | ,, | 2 | 17 ,, |
| 43 | Saha Ally..... | 10 | ,, | ,, | ,, | 1½ | 17 ,, |
| 44 | Noor Mahomed .. | 3 | ,, | ,, | ,, | 8Ms. | 18 ,, |
| 45 | Soomer ..... | 8 | ,, | ,, | ,, | 1 Yr. | 28 ,, |

* Operated upon by Dr. Meane, H. M.'s 46th Regt., who has the Calculus.

*from 1st Jan. to 31st Dec. 1859. By Assist. Surg. Stedman, Civil Surg.*

| Operation. | Result. | Discharged or died. | No. of Calculi. | Composition of outer layer of Calculi. | Weight. |
|---|---|---|---|---|---|
| 1859 | | 1859 | | | oz. dr. gr. |
| 6 Jan. | Recovery. | 1 Feb. | 1 | Impure Urate ..... | 0 2 9 |
| 15 ,, | ,, | 19 ,, | .. | ..... | .... |
| 2 Mar. | ,, | 24 Mar. | 1 | Impure Urate ..... | 1 1 52 |
| 3 ,, | ,, | 10 Apr. | 1 | Impure Oxalate..... | 0 6 0 |
| 3 ,, | ,, | 27 Mar. | 1 | Impure Urate ..... | 0 7 13 |
| 7 ,, | ,, | 26 ,, | 1 | Impure Phosphate ..... | 0 1 28 |
| 7 ,, | ,, | 21 Apr. | 2 | Ditto ..... | 0 1 0 |
| 7 ,, | ,, | 8 ,, | 2 | Oxalate of Lime ..... | 0 1 6 |
| 7 ,, | ,, | 13 ,, | 1 | Impure Urate ..... | 2 7 0 |
| 16 ,, | ,, | 12 ,, | 1 | Impure Oxalate..... | 0 3 9 |
| 16 ,, | ,, | 3 ,, | 2 | Impure Phosphates ..... | 0 6 56 |
| 23 ,, | ,, | 25 ,, | 1 | Impure Oxalate..... | 0 1 55 |
| 23 ,, | ,, | 20 ,, | 2 | Oxalate of Lime ..... | 0 0 46 |
| 23 ,, | ,, | 28 ,, | 2 | Impure Phosphate ..... | 1 2 6 |
| 5 Apr. | ,, | 26 ,, | 1 | Oxalate of Lime ..... | 0 3 12 |
| 5 ,, | ,, | 25 ,, | 2 | Impure Phosphate of Lime. | 0 3 34 |
| 12 ,, | ,, | 27 ,, | 2 | Triple Phosphate ..... | 0 4 13 |
| 18 ,, | ,, | 11 May | 1 | Oxalate of Lime ..... | 0 5 15 |
| 16 May | ,, | 9 July | 1 | Impure Urate ..... | 2 6 0 |
| 21 ,, | ,, | 30 June | 3 | Impure Phosphate of Lime. | 0 3 16 |
| 20 ,, | Died.... | 17 ,, | 3 | Impure Urates ..... | 1 4 40 |
| 21 June | Recovery. | 6 Aug. | 1 | Oxalate of Lime ..... | 0 0 21 |
| 21 ,, | ,, | 14 July | 1 | Ditto ..... | 0 4 30 |
| 21 ,, | ,, | 15 ,, | 1 | Ditto ..... | 0 0 15 |
| 7 July | ,, | 29 ,, | 1 | Impure Phosphate ..... | 2 6 0 |
| 18 ,, | ,, | 29 ,, | 1 | Impure Oxalate ..... | 0 0 21 |
| 20 ,, | ,, | 1 Aug. | 2 | Impure Urates ..... | 0 5 0 |
| 21 ,, | ,, | 12 ,, | 1 | Ditto ..... | 2 1 0 |
| 6 Aug. | ,, | 26 ,, | 1 | Impure Phosphate ..... | 1 2 0 |
| 12 ,, | ,, | 14 Sept. | 1 | Urates ..... | 1 5 48 |
| 26 ,, | ,, | 15 ,, | 2 | Impure Oxalate ..... | 0 2 5 |
| 26 ,, | ,, | 11 ,, | 2 | Phosphate of Lime ..... | 2 3 45 |
| 23 Sept. | ,, | 7 Oct. | 2 | Triple Phosphate ..... | 0 6 32 |
| 23 ,, | ,, | 16 ,, | 1 | Impure Oxalate..... | 0 2 30 |
| 4 Oct. | ,, | 15 Nov. | 1 | Oxalate of Lime ..... | 1 3 0 |
| 26 ,, | ,, | 12 ,, | .. | Ditto ..... | .... |
| 1 Nov. | ,, | 6 Nov. | 1 | Impure Oxalate..... | 0 0 26 |
| 1 ,, | ,, | 20 ,, | 1 | Not yet ascertained ..... | 1 4 28 |
| 14 ,, | ,, | 10 Dec. | 1 | Ditto ..... | 0 5 50 |
| 16 ,, | ,, | 15 ,, | 3 | Ditto ..... | 0 0 30 |
| 12 Dec. | ,, | 11 Jan. 60 | 1 | Ditto ..... | 1 6 0 |
| 19 ,, | Died.... | 30 Dec. 59 | 1 | Ditto ..... | 0 3 0 |
| 19 ,, | Recovery. | 4 Jan. 60 | 1 | Ditto ..... | 0 3 30 |
| 19 ,, | ,, | 31 Dec. 59 | 1 | Ditto ..... | 0 3 0 |
| 29 ,, | ,, | 13 Jan. 60 | 1 | Ditto ..... | 0 3 30 |

*Number of Members attending the Monthly Meetings of the Medical and Physical Society for the under-mentioned Years.*

| | 1849 | 1850 | 1851 | 1852 | 1853 | 1854 | 1855 | 1856 | 1857 | 1858 | 1859 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| January .. .. .. .. | 0 | 15 | 8 | 7 | 8 | 7 | 10 | 8 | 7 | 11 | 9 |
| February .. .. .. .. | 0 | 10 | 6 | 0 | 5 | 10 | 10 | 7 | 10 | 11 | 13 |
| March .. .. .. .. | 10 | 15 | 6 | 8 | 9 | 13 | 10 | 10 | 8 | 7 | 12 |
| July.. .. .. .. .. | 12 | 6 | 10 | 9 | 11 | 10 | 10 | 8 | 11 | 15 | 12 |
| August .. .. .. .. | 9 | 7 | 7 | 12 | 13 | 10 | 9 | 8 | 0 | 14 | 12 |
| September .. .. .. .. | 10 | 5 | 11 | 7 | 11 | 10 | 12 | 12 | 15 | 14 | 10 |
| October .. .. .. .. | 15 | 5 | 11 | 11 | 14 | 8 | 13 | 9 | 8 | 13 | 7 |
| November .. .. .. .. | 15 | 0 | 6 | 10 | 10 | 11 | 9 | 8 | 12 | 10 | 8 |
| December .. .. .. .. | 9 | 8 | 7 | 8 | 6 | 12 | 5 | 5 | 9 | 9 | 9 |
| Total .. .. .. .. | 80 | 71 | 72 | 72 | 87 | 91 | 88 | 75 | 80 | 104 | 92 |
| Average .. .. .. .. | 11·3 | 8·7 | 8 0 | 9·0 | 9·6 | 10·1 | 9·7 | 8·3 | 10·0 | 11·5 | 10·2 |

# APPENDIX.

# APPENDIX.

## No. 1.

*Note on the Climate of Kurrachee.*—By D. Grierson, M.D., Staff Surgeon.

Presented by the Director General, Medical Department.

The climate of Kurrachee divides itself, regard being had to temperature, into four seasons;—the hot and cold seasons are distinctly opposed. The times of transition are less clearly marked, yet uniformly regular in their revolving course. May and June are the hottest months; December and January those of the greatest cold. But if we associate with these the months most allied to them in their characteristics, then to the hot months must be added July, August, and September, and we must join to the months of greatest cold, February, which assimilates most with them. Between these two seasons, in the respective extremes, come March and April, the intermediate spring months, and October and November, the intermediate months of autumn. If we take the average for this year, we obtain for the five summer or hot months a maximum of 93°, mean 88°, minimum 74°: the autumnal months give maximum 87°, mean 77°, and minimum 68°: the winter months are maximum 79°, mean 67°, minimum 54°; and the spring months are represented by maximum 84°, mean 78°, minimum 68°. The difference of the mean temperature of the hot and cold seasons, it will be observed is 21°, but the mean temperature of the spring and autumn differs only by 1°. The similarity of these two seasons, in point of temperature, is equally well marked in the comparison of individual months: but in making this comparison, it is to be observed, that for obvious reasons the first month of the intermediate spring months is to be compared with the last of the autumn intermediate months, and the first of the latter season with the last of the former. By these properties, these two seasons are not only allied to each other, but separated and distinguished from the two opposite seasons of heat and of cold. The mean temperature of these months is also the mean temperature of the year. Well marked, however, as

the seasons are, viewed in this light, it is necessary that it be kept in mind that the transitions of the seasons do not fall coincidently with the changes or commencement of the months. They fall rather in the middle of the months; and in stricter propriety one might say the changes fall in the middle of February and the middle of April, the middle of September and the middle of November. Other phœnomena besides temperature characterize these seasons. The winds differ, the humidity of the air is very different, and the condition of the sky changes also with remarkable regularity. In the cold season the winds are mostly northerly, clouds frequent, dust often obscures the air from the violence of the winds, and dew sometimes and often falls. In the intermediate temperate seasons, the winds are light, variable, shifting; generally in the morning coming from east to north-east, and in the evenings from west and south-west, assuming the habits of the land and sea breezes. The humidity of these seasons is not considerable, and November is remarkable for dryness of the air. Rain is very rare in March, and more so in October. The clouds are often light and flaky, fringing the horizon in the mornings and evenings, and giving, by refracted light, when the sun rises or sets, a pleasing brilliancy and lustre to those regions where he vanishes or first appears. The hot season increases in humidity from May till August. Rain is rare in May,—July and August are the months of rain; but the former yields twice as much as the latter. The average fall for these months is,—July 5 inches;—August rather more than $2\frac{1}{2}$ inches;—the remaining $2\frac{1}{2}$ inches, which complete the average, are distributed throughout the other months. A welcome change comes over the sky in June about the middle of the month. May is clear and hot, and the heat increases in June; but the sky, about the time mentioned, becomes covered with clouds; occasional slight showers are precipitated, and the temperature slightly falls. The winds blow strongly from the south-west; the sea sends high tides far up on the land, and breaks with violence on the beach; everything shows in short that, though being extratropical, the head of the bay, which limits the great Arabian sea, is beyond the watery range of the S.W. monsoon; yet the winds and the clouds driven before it extend a favoring influence to the sea border of Sind; and it is due also without doubt to the same cause that clouds prevail till the middle of September, and that rain falls in the months of July and August.

The topographic features of the place are not less peculiar than the proportions of the seasons are characteristic. These it would not be

possible to treat in due limits, but an enumeration of the chief of them cannot be superfluous. The sea is in immediate contiguity, and gives origin to a swamp until submerged, and then almost drained of its waters by the alternate flow and ebb of the sea. This inlet is in extent about five square miles, and stretches to within a quarter of a mile of the cantonments relative to which it is in a south-westerly direction. The cantonments lie in the south-eastern slope of a gentle valley in which is the bed of a river, dry at all times except after the fall of heavy rains. A ridge of hills of considerable altitude bounds the horizon on the N. & N.W. Proceeding inland from the sea the ground rises, and the cantonments are almost surrounded on the land side by eminences varying in height. Cultivation is confined to very narrow limits, and does little to diversify the generally sterile and repulsive aspects of the rocky eminences, pebbly or sandy slopes, or alluvial soil of the small plains, where the surface presents a more uniform level. A tract not visible, but perhaps the most important of all, is the neighbourhood of the delta of the Indus, which débouches on the east of the bay of Kurrachee. The river makes the tract near the sea, as is well known, in the autumn months most unhealthy. In this it resembles tropical rivers everywhere. The emanations from the soil liberated from the waters of the receded inundation are recognized as the cause of this insalubrity. To what extent in space emanations like these exercise a deleterious influence on health is a question on which much ingenious speculation has been promulgated. The elements of this question, the grounds on which alone sound reason can proceed, are most difficult to apprehend. The nature and variety of the emanations are involved in much obscurity. Heat, humidity, and atmospheric air, all contribute their aid in the process of formation; but what the precise putrescible substances are, and what the products evolved under the agency of these specified conditions, are facts not accurately determined. That they are the results of the decomposition of organized substances is very generally admitted, some of these, well known, are negatively and some actively prejudicial to health; and some, it is also very generally admitted, remain hitherto little known or wholly unknown. The limits of action of these poisonous gases, however, no one can define. Concentrated, they prove instantaneously destructive of human life; but in the diffused state, how far in distance they are injurious, in what particular mode they injure, and when they cease to be injurious, are questions undetermined. Perplexing as these investigations are, the mode of diffusion of deleterious gases has been hitherto no less involved in obscurity. Yet in this direction some pro-

gress has been made. Time was when one only mode of diffusion seemed to be thought operative. This was the mechanical action of the wind moving horizontally, effecting admixture and dilution by the agency of force ; and with this seemed to be joined sometimes the erroneous notion that gases of different specific gravities, if not agitated by extraneous currents of air, maintained relatively to each other that position in strata,—one superior pressed on the other,—which the weight of each respectively assigned to it. The law of the diffusion of gases by mutual interpenetration is incompatible with this view. Hence, in a still atmosphere, a gas poured into it, moves equally in all directions. Mechanical diffusion also is real, but neither this nor the law of diffusion comprises all the agencies which operate to diffuse vapours in the air. Heat has a place and a function also, and the action of heat as an agent of diffusion, has been far too much overlooked. For example, what occurs on a great scale in the admirable interchange of the air of the tropics and polar regions may certainly take place at times in particular limited localities. Air expanded by solar heat may ascend, may be transported by an upper current in another direction than that below, till it cools and falls again to the surface of the earth or sea, where another current may carry it to the place whence it came, or it may be to places the remoteness or position of which would seem to make such a course altogether improbable. No theory of the action of noxious vapours is complete which omits any of these agencies. The subject, therefore, is one of very great complexity and difficulty ; and when to this is added the consideration that in almost any case that falls to be investigated the amount of deleterious gas or gases, developed in any given space, cannot be known, and the degree of dilution when the noxious gases cease to be prejudicial to health cannot easily be ascertained, to determine the limits and effects of mephitic gases,—the products of the hotbeds of infection in any district,—becomes a problem of almost insuperable difficulty. The scientific solution of these questions, in short, yet remains to be given. Conjectures, as is usual where precise information is wanting on subjects of interest, abound. Too commonly, inquirers, when they found fever, for instance, prevail near an acknowleged source of mephitism, have looked around for the nearest place exempt from fever, and, determining the distance between the origin of the tainted and the exempted locality, have pronounced that to be the limits of deleterious agency. Exceptions on either side have been ingeniously explained, and these explanations have been viewed with more or less satisfaction as confidence or mistrust was reposed in

the authors of these ingenious speculations. Thus, for the last sixty or seventy years, questions like these have been agitated, but progress in knowledge there has been none. Whether therefore the deleterious poisons generated in the Delta, and thence diffused in the surrounding air, taint the air of this place to that degree that it is noxious to health is a question on which opinions would be found to differ. Fevers do not prevail here with the frequency or to the extent that they are seen yearly in the Delta and almost yearly at Hydrabad, and elsewhere on the river. Yet they do prevail. Fevers, it should be understood, however, are not the only proof of a mephitic state of the air. Wherever they can be traced to this cause, these many other affections, the result of the action of the same poison, must be more or less developed though generally unrecognised, or, if more appreciable, attributed to the agency of other causes. That the atmospheric connection of this station with the Delta is prejudicial to health, though it cannot be proved in the present state of knowledge, may be assumed, it seems to me, till the contrary be established. There is no doubt at least in regard to the swampy area of five square miles adjacent to cantonments. There, all the conditions necessary to the production of mephitism exist, and there mephitism must exist, and there its effects, imperceptible as they ordinarily may be, must exist. The poison that is poured into the air must operate after the manner peculiar to it, till either it is decomposed, or diluted to an extent when it ceases to be appreciable. Dr. Livingstone gives an example of a very active poison of this kind in its effect on the crew of a Hamburgh vessel, at the village of Killimane. "The men," says he "were much more regular in their habits than English sailors, so I had an opportunity of observing the fever acting as slow poison. They felt 'out of sorts' only, but gradually became pale, bloodless, and emaciated, then weaker and weaker, till at last they sunk more like oxen bitten by *tsetse*, than any disease. A young man remained in perfect health for about three months, but was at last knocked down suddenly and made as helpless as a child by this terrible disease." Between these extreme symptoms and that condition when they just begin to deviate from health, there is no sudden or brief passage. A transition gradual and ignoble may subsist between those extremes where the maximum effect is manifested in the very focus of the evil, and that where the minimum effect, arising from the slightest deleterious agency, perhaps not appreciable according to any rule of actual serriatics, just declares itself and obtains little or no progressive development. *Natura non facit saltus.* It seems then evident that as we

have at all times more or less active the conditions which produce a contamination of the air, whether the resulting mephitism shows itself in the existence of fevers or other less marked or imperceptible deterioration of health, we are entitled to conclude that vigour of constitution is impaired, life and energy diminished, production and enjoyment lessened, by the poisonous proximity of the swamp.

Extending parallel with the beach from the side of the harbour opposite cantonments, a swamp of a similar character runs for many miles westwards. This swamp as well as the other must generate and diffuse a noxious influence, and those who live in the cantonments and especially in the city may suffer also from its diffusive operation. Thus from three quarters hurtful agencies of the like kind extend; most probably they reach to this place and exert their powers over its inhabitants. To the more habitual and more moderate degrees of this influence may be traced, it is probable, the slighter fevers which very generally obtain, and the severer forms of some cachectic complaints, such as scurvy, ulcers, chronic rheumatism, syphilis, and phthisis. When fever prevails in a more marked manner so as to resemble the endemic fevers on the banks of the Indus, the cause probably is that, from more abundant generation of miasmatic emanations in the Delta, or some peculiarity of the winds, clouds, or heat, by which the diffusion of it is more extensively promoted, the contaminated air from that source, wafted more quickly and freely to this place, displays more than its usual virulence.

If this be anything like an approximation to the true history of the climate of this station as regards soil, physical features, and meteorology, one practical inference may be very clearly deduced from it, and this is the conversion of the swamp into dry land. To modify the state of the Delta may at present be impossible, and to effect even any alteration on the great swamp which goes westward may be hopeless: but in regard to the inland swamp which is the prominent feature, and the standing reproach of Kurrachee, the extirpation of it is neither desperate nor difficult of achievment. The benefit of this work besides is obvious. To lessen the amount of tainted air is to improve health, and lessen the inroads and severity of particular diseases. If it be said that this is one of several sources of vitiated air, and to extirpate it is not to remedy the evils of the vitiated air, the consideration which repels this objection is not remote nor absent, for though the entire removal of the results of a contaminated air is not to be anticipated, a diminution of these results is certain. It is quite possible some form of disease might cease or

almost entirely cease, as, for instance, scurvy; fever would be less frequent and severe; and those occasional epidemic incursions of this disease would be less formidable. These consequences of the completion of a very desirable public work it is not extravagant to expect. To withdraw a certain amount of miasma is to improve the air, and this may be the measure which shall improve and purify it to that degree that the diseases peculiar to a mephitic air shall no longer develope themselves; and if they do not wholly disappear their appearance will certainly be attended with diminution of intensity. Decreasement of disease, prevention of suffering, and preservation of life,—these are the results of the accomplishment of this public enterprise.

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## No. 2.

*Notes relative to cases of Sunstroke at Baroda.*—Compiled from official papers in the Director General's Office, Bombay.

Presented by the Director General Medical Department.

The Brigadier Commanding at Baroda wrote, under date 3rd June 1859, to the Quartermaster General of the Army, as follows:—

"I deeply regret that I have to report a sudden and almost unaccountable mortality amongst the non-commissioned officers and soldiers of the K Battery,* Royal Artillery. Within the last seven days, ten men have died, one of apoplexy and nine of stroke of the sun, and this though every possible endeavour has been made to guard against the extreme heat of the weather, by discontinuance of all exercise parades—by restricting the men to barracks between the hours of 8 A. M. and 5 P. M.—by rendering the barracks themselves as cool as practicable, by the use of punkahs, &c. day and night,—and by checking the consumption of spirits and porter in the canteen. All has been of no avail: every day one or two men have died, generally after but a few hours' indisposition,—the strongest and finest looking men being the first to suffer. Finding, on inquiry, that the men of the company were losing heart, and from their depression of spirits were daily becoming more susceptible of disease (imagination in many cases leading them to fancy themselves struck, when in reality nothing ailed them), I readily assented to the urgent recommendation of the

* 1st Company, 13th Brigade.

medical officers of the brigade to march the company out for a change, believing that, although in tents the thermometer might stand higher than in barracks, yet to the soldiers' sensations it would appear cooler, and their thoughts being diverted by change of scene, they might recover a healthy tone of mind, and with it their bodily health. The company (with the exception of a few men left to look after the battery and horses) broke ground yesterday morning, marching about a couple of miles only to a grove of mango trees, on a piece of open ground. It was reported to me in the evening that the men seemed already in better spirits; one casualty only had occurred, and that was a case admitted into hospital before leaving cantonment. During the night, the company moved on fourteen miles to Dubka, on the banks of the Mhye, within the influence of the sea-breeze, and where the soldiers may find plenty of amusement. I trust in the course of a few hours, to receive a favourable account of the result of the march, and will duly communicate the same to you, for submission to the Commander in Chief. I trust His Excellency will approve of the steps I have adopted. As soon as the medical officer of the Battery can obtain the requisite leisure, I shall desire him to furnish a full report of this case, for the satisfaction of His Excellency. In the meanwhile, I may note a feature peculiar, as well as gratifying, in considering the circumstances I am now reporting: the detachment of two companies of the 4th Foot, quartered in barracks of the same construction and immediately adjoining those of the artillery, have only lost one man by *coup de soleil* and are generally as healthy as we can expect, having but 20 sick (no serious cases) out of 171 men."

The Medical Officer of the Artillery, Assistant Surgeon Chapple, forwarded the following report about the end of June to the Deputy Inspector General Queen's Troops, and to the Superintending Surgeon:—

"Although there were two deaths in the early part of May, the general health of the men up to the 27th of the month was good; on that date there were 15 men in hospital and 9 attending, but one death having occurred on that day, and three the day following, the men became much alarmed, and the numbers rapidly increased until the 1st instant, when there were in hospital 37 and 33 attending, which was the maximum. From the 27th ultimo to the 2nd instant inclusive, there were 10 deaths. In consequence of the sickness, all drills and parades were suspended; the men were, from the heat, necessarily confined to their barracks from an early hour in the morning till late in the evening, during which time they continually saw those considered

most healthy amongst them removed to hospital, in many instances never to return. The men had no occupation to divert their minds from gloomy thoughts, and they consequently became much depressed. Under these circumstances, I deemed a total change of air and scene absolutely necessary, and made application on the 1st instant to the Brigadier Commanding to remove the men to Cambay or Dubka. On the 2nd instant, the Battery was moved to the race-course, and, on my urgent solicitations, next day to Dubka. We arrived at the latter place on the 3rd instant, and from that date the men rapidly improved in health and spirits. On the 13th instant we returned to Baroda, with fewer sick than we had for some weeks previously.

That the great increase of sick from the 27th ultimo to 2nd instant was due to nervous depression, I have no doubt; many applied to Hospital who, at any other time, would not have thought anything of their ailments, fearful that the slightest indisposition might be the precursor of fatal disease. But it was not amongst those men that the mortality occurred; the greater number of those who died never complained, and never reported themselves sick until brought from the barracks to the hospital with the usual train of fatal symptoms, which, if not fully developed at the time, were in a very short time after admission unmistakeably established. One instance came under my especial observation :—About 3 o'clock P.M. on the 28th ultimo, I was in one of the barrack-rooms, attending a man labouring under an epileptic attack ; whilst there, I noticed a gunner lying on his bed seemingly quite unconscious of the bustle going on about him. I inquired if he was ill, and was told that he was not very well that day. I went to him, and asked him if he was unwell ; he said "No." I asked him if anything was the matter with him ; he said "No ; only that my head feels a little queer." His manner struck me as being listless, he spoke as if only half awake ; his skin was hot, pulse regular. I told him it was better for him to go to hospital, which was close by. Having wrapped his head in a wet towel, I put him into a dooley and conveyed him to hospital ; he was dead next morning.

Having carefully inquired into everything which could in any way tend to this mortality, I have found the following results :—

*Diet and Barracks.*—The diet could not influence this mortality I am convinced, being good and nutritious, and containing nothing which could prove injurious to the health of the men. The barrack accommodation is good ;—the rooms are well ventilated, and not crowded ; deaths occurred out of those newly constructed, equally as out of the oldest.

*Duty.*—Five days out of seven, the men turn out for duty soon after gunfire, after which they go to stables, which occupies them until near 7 o'clock A.M. They then go to breakfast, after which the drivers return to the harness room, about 150 yards from the barracks ; they generally return from there about 10 o'clock A.M. In the evening, turn out again for stable duty about 5 o'clock, at which time the sun is still powerful (the usual absence of any breeze about this hour renders it the most oppressive and closest period of the day). They may remain at stable about an hour, when their duty for the day is completed. It is worthy of remark, that almost all the fatal cases were brought to hospital between 8½ o'clock and 11 o'clock P. M.

*Temperature.*—On the 27th of May, on which day the first fatal case occurred, the barometer showed the first indication of a steady fall (owing no doubt to the approach of the monsoon) ; at the same time the thermometer registered a higher temperature than any day previous, being 110° in the shade at 4 o'clock P.M. ; the night also showed a corresponding rise in temperature.

*Intemperance.*—That intemperance occasioned the mortality (with one exception) there is no doubt; some are mentioned as very "free drinkers," others as "hard drinkers;" and I am convinced when the nervous depression, before alluded to, seized the men, that many had resort to drink as a relief. I have carefully examined the canteen reports, as far as I had the means of doing so, and I found the quantity daily consumed very high ; but on the 29th, though there were fewer men on the effective strength (in consequence of the increase of sick and convalescents), and therefore fewer men to drink the usual ration, the expenditure of arrack was greater than on any day previous, proving that the men resorted to the canteen at that time more frequently than usual.

The high temperature acting on men of intemperate habits, of course rendered them more liable to suffer from exposure ; and to these combined causes, high temperature, exposure, and intemperance, I attribute the mortality.

The means adopted to prevent further progress of the mortality were suspension of drills, parades, and the closure of the canteen, with the exception of the issue of one pint of porter per man daily, and removal to the sea coast.

The following are abstracts of some of the cases :—

No. 1.—Gunner R. W. ; age 22 years ; service 3 years ; 6 months in India. Was admitted into hospital 28th May about 8½ P.M. ; he was then very weak,—pulse small, quick, and compressible,—extremities

cold,—drowsy, inclined to sleep whilst spoken to,—temperature of body natural, head cool,—eyes clear; a blister was applied to back of head, and brandy and water was administered; the extremities were well rubbed: spirit. ammonia aromatic given, as there was still great inclination to coma. Blisters were applied to different parts of the body, but before they could produce any effects on the skin, the pulse became irregular,—vessels of conjunctivæ suffused,—pulse contracted,—breathing laboured with sighing respiration. As there was total paralysis of muscles of deglutition, stimulating enema were administered; but the patient gradually sank, and died at 11½ o'clock P.M., 3 hours after admission.

No. 2.—Gunner D. K.; aged 20 years; service 3 years; six months in India. The deceased,—thin, pale, delicate looking, said to be a free drinker,—was reported to me as labouring under an epileptic attack to which he was subject. When I saw him he was very restless, endeavouring to get out of bed. There were muscular spasms of the whole body, sometimes in the legs, at other times in the arms; but at no time did they resemble the clonic spasms of epilepsy. His face was pale,—lips and eyelids livid,—body warm,—extremities cold,—conjunctivæ clear,—pupil natural and affected by light. He seemed quite unconscious, but when roused, understood what was said to him, but could not speak; pulseless; action of heart quick. I gave him a couple of ounces of wine, had his extremities well rubbed, applied mustard sinapisms; and, after a dose of aromatic spirits of ammonia and another dose of wine, he recovered sufficiently to sit up in the bed and express himself much better. His pulse could be felt at the wrist, but quite feeble; he was perfectly conscious; stated that he had no headache, and no uneasiness or pain in it or in any part of the body; with exception of a tightness across the chest, he said that he felt a weakness, but that he would be all right after a sleep. He stated that he was not drowsy, his bowels were quite regular. I then told him to lie down; and in less than half an hour, before I had left the hospital, I was called to him. He was endeavouring to get out of bed, quite delirious,—pulseless,—the eye was clear, pupil moderately contracted (insensible to light),—head cool—extremities cool,—lips and eyelids livid,—surface of chest and abdomen natural in temprature. He vomited slightly, chiefly the liquor which he had taken. There was total inability to swallow. After a short time, the restlessness was succeeded by perfect quiet,—breathing became laboured, slow, and sighing,—conjunctivæ injected,—pupils contracted,—the skin

became hot,—a peculiar pulsation was felt in the femoral artery, very quick, more like the thrill of an electric current passed through a nerve than the injection of blood,—no arterial pulsation could be detected in head, arms, or legs, with exception of femoral,—his bowels were involuntarily opened. His breathing gradually became slower, and more laboured, the action of heart more irregular and feeble. In this state he continued for some time, when his face became quite livid, froth issued from his mouth, contents of stomach were ejected through the nostrils, and he died 10 hours after first seizure. He was treated as follows :—blisters were applied to back of the head, dry cupping to back of neck, and then six ounces of blood taken by cupping glasses, strong mustard sinapisms to extremities. Spirit ammoniæ fort. was rubbed into the calves of his legs and thighs, and stimulating enema of brandy, camphor, and ammonia administered.

No. 3.—Driver A. H.; age 23 years ; service 3 years, and 6 months ; in India, 7 months and 20 days. Was called to see deceased on the 28th of May. On my arrival, I found him very restless, tossing about in the bed quite insensible,—pulseless,—pupils contracted,—eyes suffused,—skin hot, and head hot,—femoral artery beating with a peculiar nervous thrill, felt easily by laying the hand on the upper third of the thigh,—no pulsation could be detected in either of the arteries of the head, arm, or legs, with exception of the femoral,—the action of the heart was violent. On inquiry, I found that, about ten minutes before I saw him, he suddenly called out to one of his comrades to hold him ; he then fell on his hands and knees, and before they could catch hold of him, he became delirious and restless, the same as when I arrived. Cold water was poured on his head from a height, 4 dozen leeches were applied at the same time ; stimulating enemata were also exhibited, and strong counter-irritants to extremities, but they were of no avail ; the respiration became laboured, slow, and sighing—the face suddenly assumed a livid appearance,—froth issued from the mouth,—contents of stomach poured through the nostrils,—pupils dilated,—and he expired about 1½ hour after seizure.

No. 4.—Bombardier J. D. ; age 25 years ; service 4 years 11 months ; in India 6 months. Came to hospital 3 o'clock P.M., June 2nd. He was then complaining of pain in the head ; his pulse was full and quick (120), —his skin hot and dry,—his eye quite clear,—pupils natural and sensible to light. He was quite conscious and able to explain his feelings ; stated that the head-ache came on the night before, but having bathed himself in cold water it went away, and that he slept pretty well ; that

next morning it returned, and continuing to grow worse as the day advanced, he was obliged to go to hospital; his bowels were confined. Whilst speaking, his arm began to shake violently; I asked if he felt nervous, he said, "No;" but he could not stop the shaking; his arm gradually bent up, so that it was with the greatest difficulty I extended it. Cold water was poured on his head with relief; his pulse being full, I bled him from the arm; but before six ounces were taken away, he was pulseless in the opposite wrist. I then stopped, and administered wine, 4 dozen leeches to the head, had the hair cut, and put on a freezing mixture. I then put his feet in boiling water which had the effect of blistering him at once. Half an hour after admission his respiration was sighing,—pulse quick and soft,—conjunctivæ suffused,—pupil contracted and insensible to light; was quite unconscious: a blister was applied to back of the head. About an hour and a half after admission, his pupil gradually dilated and remained so for about 10 minutes, but insensible to light: it again contracted. The purgative acted twice freely, but there was no improvement, and he died at 4.40. P. M., an hour and 40 minutes after admission.

No. 5.—Gunner E. J.; age 28 years; service 3 years; and 6 months in India. Was seen by me in the barrack-room at 3 o'clock P. M., and from his appearance I sent him to hospital. He was listless and drowsy,—his skin hot,—pulse regular; did not complain of his head. Soon after admission, his head became hot; 4 dozen leeches were applied to it, and a cold lotion; a strong purgative was also given. Strong mustard sinapisms made with acetic acid were applied to the extremities. After the lapse of about 1½ hour, the conjunctivæ became slightly conjected,—the pupils contracted,—pulse quick (120) and regular,—breathing slow and laboured,—unconscious,—paralysis of the muscles of deglutition; a blister was applied to head. He remained in this state a couple of hours, when the pulse assumed an irregular intermittent character. The bowels were opened freely by the medicine which was administered, but without any mitigation of symptoms; the respiration sighing and laboured. He remained in this state till 4 o'clock A.M., on the morning of the 29th, when he died, 11 hours after admission.

No. 6.—Corporal W. H.; age 20 years; service 4 years, and of these about 6 months were in India; health generally very good; of rather intemperate habits. Brought to hospital about 11 P.M., and then complained of head-ache, which he said he had the greater part of the day; his face was flushed, and eyes were rather red,—no smell of liquor

about him,—skin was rather hot and dry, and tongue furred,—pulse moderately full and regular,—bowels opened once during the day. A brisk purgative was immediately administered, and cold water applied to the head from a height. This seemed to give some relief, but in about half an hour he complained of a feeling of oppression, and soon afterwards became insensible. The pupil on admission was moderately contracted, but soon became much so, and both to an equal extent and insensible to light. He could not take anything to drink, and any attempt to swallow produced symptoms of suffocation. The respiration was slow, laboured, and partly sighing and moaning; pulse (125) regular and hard. Leeches to temples, and blisters to head, with hot water and mustard to feet and legs were applied, but without any benefit. There was no improvement, and he died in about ten hours after admission.

No. 7.—Corporal J. S.; age 25 years; service 4 years, of which 6 months were in India; health very good to the date of admission; he had the name of being a free liver; he was brought to hospital about 7 P.M., and there complained of head-ache and difficulty of breathing, or, as he expressed it, oppression about the chest; the skin was hot,—the face rather flushed,—and the pulse quick but regular,—bowels confined. An aperient was immediately administered, and cold lotion applied to the head; leeches, 3 dozen, were applied to the temples, and cooling drinks given. After this treatment, he seemed better, but became suddenly much worse and insensible about ten o'clock; his face was then rather pale,—the head cool,—the pupils equally and very much contracted, and insensible to light,—the vessels of conjunctivæ were rather congested,—the skin was hot and dry,—the respiration slow, not being more than 12 per minute, and of a sighing character, accompanied by moans occasionally,—there was paralysis of the muscles of deglutition. The pulse was upwards of 120, small and jerking, and not easily to be felt. As the purgative had not acted, a strong purgative enema was administered, which acted soon afterwards, bringing away some scybillæ, a blister to scalp and neck was then applied, and mustard poultices to the legs. There was no evident improvement; and as the pulse began to fail about 11½ P.M., ammonia, brandy, &c., were administered by the rectum. There was no reaction, and, the pulse gradually sinking, he expired about 5 A.M., the pupils rapidly dilating just before death.

No. 8.—Bombardier H H.; service 5½ years, of which 6 months were in India. Admitted on June 1st, 1859, died June 2nd; aged 27. He came into hospital on the morning of 1st June, and then com-

plained of having slight headache, but nothing more; and there was nothing peculiar in his appearance. As his bowels were confined, he had a brisk purgative. Cold applications to head. He appeared to be as usual during the day, and his headache not worse; but in the evening he was much depressed in spirits, and was seen to weep frequently in consequence of the numerous cases coming into Hospital. In the evening also, there was nothing remarkable about him, except the depressed state mentioned, but about 10½ P. M. I was called to him from another patient in Hospital upon whom I was attending, and found him almost insensible,—the face pale,—the pulse (110) regular and moderately full,—the pupils moderately contracted, and sensible to light,—and the respiration slow and sighing. As he could still swallow, some brandy was given him, which he took with difficulty, and a strong enema of sulphate of magnesia, turpentine, &c., administered: he seemed to improve slightly, but soon afterwards became insensible,—the pupils much contracted, and quite insensible to light,—the vessels of conjunctivæ became rather congested, and the conjunctiva itself suffused. At this time, the pulse rose to about 120, and was regular. Boiling water was applied to the legs and over the head, and leeches applied to head; he was also cupped on the neck. The legs were blistered by the water, but there was no improvement; and he expired on the morning of the 2nd, about 3 o'clock.

*Post-mortem appearances* 3½ *hours after death. Head.*—The membranes and outward surface were quite healthy, but on cutting into the substance of the brain both the cortical and the medullary substance presented many bloody points; there was no effusion. *Thorax.*—Lungs healthy; heart healthy. *Abdomen.*—Viscera perfectly healthy; kidneys slightly congested.

No. 9.—Serjeant C. S; aged 30 years; service 12 years; disease apoplexy. Was reported to me about 10 o'clock P.M., as having been seized with a fit. The patient was a man of very full habit, and was much addicted to drink. He always, up to the period of his fatal illness, enjoyed good health, with the exception of palpitation of the heart, from which he occasionally suffered. On my arrival at the hospital, he was quite insensible,—pulseless,—respiration sighing,—face turgid,—eyes suffused, pupils contracted,—extremities cold,—forehead and face bathed in cold perspiration,—total paralysis of muscles of deglutition. His breathing gradually became more laboured and gasping; action of the heart very irregular, sometimes violent, then

very slow, then intermittent : this irregularity became more apparent as death approached. He continued in this state, gradually sinking, for about 9 hours, when vomiting took place, the pupils suddenly dilated, and the patient expired.

*Treatment.*—The back of the head was shaved, and liquor lyttæ rubbed in for about ¼ of an hour, then a blister was applied to the part, mustard sinapisms were applied to the extremities, strong spirit of ammonia was also rubbed in : as there was throughout a tendency to collapse, stimulants were administered through the rectum, consisting of camphor, ammonia, and brandy.

*Post-mortem appearances 5 hours after death. Head.*—The dura mater was found firmly adherent to the frontal bone ; the adherences were of long standing ; the bone was very thin over the part. The brain was found slightly congested externally, but quite healthy internally. *Thorax.*—Lungs quite healthy ; heart enlarged, mitral valves slightly thickened, walls of left ventricle thickened. *Abdomen.*—Liver enlarged, gall bladder much distended, spleen small and flabby ; kidneys much congested, left one much enlarged ; other viscera healthy.

No. 10.—Corporal M. W.; aged 28 years; service 4 years; said to be a free drinker. Was admitted into hospital on the 27th May; he was then complaining of a pain in the head which he stated was not severe; he said he wished to see me when I paid my afternoon visit to the hospital. He then sat on one of the beds talking to some of the men, when he was noticed breathing heavily and falling off to sleep. I was sent for, and on my arrival found him quite insensible,—pulseless,—respiration laboured and sighing,—face much congested,—eyes suffused,—pupils contracted; surface of body was hot. Water was poured from a height on his head, which seemed to cool it ; four dozen leeches were applied to the head ; and as there was total paralysis of the muscles of deglutition, a brisk purgative enema was administered ; the back of the head was shaved, and a blister applied and strong mustard sinapisms were applied to the extremities, but as they did not produce the slightest effect, spirits ammonia fort. was rubbed in, until redness was well produced. The action of the heart was violent, but as the disease advanced it became very irregular ; the breathing gradually became more laboured and slow, the action of the heart weaker as the disease advanced ; and the patient died 8 hours after he came to hospital.

*Post-mortem appearances 4 hours after death. Head.*—Slight serous effusion at the base of the brain and in the ventricles; the substance and membranes were slightly congested. *Thorax.*—Lungs healthy. *Heart.*—There was a good deal of fat deposited externally; the muscular tissue of the right auricle was very thin, the last substance being replaced by fatty deposit. *Abdomen.*—Liver healthy; gall bladder distended with bile; spleen healthy; kidneys a good deal congested; other viscera quite healthy.

No. 11.—Private W. C.; aged 24 years; service 6 years, 6 months in India. Was brought to hospital about 6 o'clock P. M., on the 16th, he was then in the following state:—Skin hot and dry,—conjunctivæ suffused,—pupil contracted,—face flushed,—pulseless,—action of the heart violent and irregular,—respiration very much laboured and sighing. He had been taken suddenly ill whilst in the barrack-room, and immediately conveyed to hospital:—he was of very intemperate habits. Cold water was poured from a height; three dozen leeches were applied to the head; strong counter-irritants to the extremities; brisk purgative enema were administered but not retained, in consequence of the paralysis of the sphincter ani. The patient rapidly sank, and died about half an hour after admission.

*Post-mortem appearances 4 hours after death. Head.*—On making the first incision into the scalp, there was an unusual flow of blood, the integuments were very much congested; the membranes of the brain were also tinged; the surface of the brain was congested, but on cutting into the substance it was quite natural; no effusion in the ventricles. *Thorax.*—Lungs quite healthy; heart healthy. *Abdomen.*—The viscera in abdominal cavity were all perfectly healthy.

No. 12.—Gunner J. F.; admitted June 1st; died June 1st. Age 27 years; service 1 year 2 months, of which about 6 months were in India. Health in general very good, his habits intemperate. He was brought to hospital on the evening of 1st June, complaining of very severe head-ache, and a feeling of oppression about the chest. He had been drinking before he was brought to hospital, as there was the smell of arrack about him; he vomited soon after admission. The vessels of the conjunctivæ were rather congested, and the pupils a little contracted, but quite sensible to light. There was a hot skin, and a great desire for drink;—pulse (122) regular, and moderately full; bowels not freely opened for some time. Cold water from a height was freely poured on his head, and a strong purgative enema given. He

seemed to get a little better, but in almost half an hour he became much worse, the conjunctivæ more congested, and the pupils much contracted and insensible to light. Leeches (3 dozen) were then applied to the head, which produced no change for the better. He soon became quite insensible, the pulse rose to 130, and was very irregular; he could not swallow, and the respiration was slow, partly sighing and partly sterterous. A blister was then applied to back of head and neck, the hair having been shaved, and plasters of mustard and strong acetic acid to the legs, but they did not produce any effect, and he expired 8 hours after admission.

*Post-mortem appearances* 4 *hours after death. Head.*—The membranes of brain were slighly congested; there was slight serous effusion (about ½ oz.) at base of brain; substance of brain quite healthy; no effusion in ventricles. *Thorax.*—Lungs healthy; heart large with a good deal of fat deposited externally; the walls of the right ventricle very thin, otherwise quite healthy. *Abdomen.*—Liver and spleen healthy; kidneys slightly congested; other viscera healthy.

A Medical Committee was ordered to report upon the extraordinary sickness in No. 1 Battery 13th Battalion Royal Artillery, and to assign, if possible, a reason for the mortality that took place in its ranks, whilst the Detachment 4th (King's Own) Regiment quartered in barracks immediately adjoining, and living under precisely similar conditions, exhibited only an average amount of sickness. The committee, after careful investigation of all the circumstances, arrived at the conclusion that the mortality among the men of the Royal Artillery was caused by the exposure of men of intemperate habits to the heat and sun, and that the comparative immunity of the detachment 4th Royal Regiment arose from their more abstemious habits and less exposure. No cause for the mortality among the men of the Artillery could be traced to the barrack accommodation, as those who died came equally from the old and the new barracks, the rooms of which are as near as possible like those occupied by the detachment of the 4th (K. O.), nor could any cause be traced to diet, as the rations received were very good, and could not in any way have proved injurious to the health of the men, and were similar for the Artillery and for the 4th (K. O.)

*Comparative Statement of the Health of No. 1 Battery, 13th Battalion Royal Artillery, and the Detachment 4th (King's Own) Regiment for the period noted.*

| | 1st Battery 13th Battalion Royal Artillery. | | | | | 4th (King's Own) Regiment. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Strength of Non-Commissioned Officers and Men. | Sick in Hospital. | Attending Hospital. | Number of Sun-strokes or Apoplexy. | Remarks. | Strength of Non-Commissioned Officers and Men. | Sick in Hospital. | Attending Hospital. | Number of Sun-strokes or Apoplexy. | Remarks. |
| May 27 | 211 | 15 | 9 | 1 | | 171 | 20 | .. | .. | |
| ,, 28 | 210 | 22 | 20 | 3 | | 171 | 24 | .. | 1 | |
| ,, 29 | 207 | 30 | 27 | 1 | | 170 | 22 | .. | .. | |
| ,, 30 | 206 | 36 | 31 | 1 | | 170 | 22 | .. | .. | |
| ,, 31 | 204 | 37 | 24 | 1 | | 170 | 17 | .. | .. | |
| June 1 | 202 | 37 | 33 | 2 | | 170 | 14 | .. | .. | |
| ,, 2 | 201 | 25 | 37 | 1 | Marched to Race Course. | 170 | 14 | .. | .. | Remained at Baroda. |
| ,, 3 | 201 | 16 | 39 | .. | Marched to Dubka.* | 170 | 12 | .. | .. | At Baroda. |
| ,, 4 | 201 | 15 | 31 | .. | At Dubka. | 170 | 13 | .. | .. | |
| ,, 5 | 201 | 15 | 20 | .. | | 170 | 12 | .. | .. | |
| ,, 6 | 201 | 14 | 9 | .. | | 170 | 12 | .. | .. | |
| ,, 7 | 201 | 14 | 4 | .. | | 170 | 10 | .. | .. | |
| ,, 8 | 201 | 13 | 6 | .. | | 170 | 11 | .. | .. | One man died of Erysipelas. |
| ,, 9 | 201 | 13 | 6 | .. | | 169 | 11 | .. | .. | |
| ,, 10 | 201 | 11 | 4 | .. | | 169 | 11 | .. | .. | |
| ,, 11 | 201 | 11 | 4 | .. | | 169 | 11 | .. | .. | |
| ,, 12 | 201 | 11 | 7 | .. | | 169 | 13 | .. | .. | |
| ,, 13 | 201 | 13 | 9 | .. | [Dubka. | 169 | 14 | .. | .. | |
| ,, 14 | 201 | 13 | 9 | .. | Returned from | 169 | 15 | .. | .. | |

Note.—*Temperature.*—The heat during the latter half of May was very oppressive, the thermometer registering in the shade an average of 106° at 4 P. M.; and on the 1st and 2nd June it was 110°, on the 3rd only 100°; and after this there was a steady diminution.

* "*Dubka* is a beautiful well-wooded spot on the banks of the Myhee, open to the N. W. across the river, which may be 100 feet below the bank, and about 300 yards wide. Beyond it, and barely out of the reach of floods is an extensive plain about one mile wide, covered with tamarisk jungle and cultivation in about equal quantities; with the high bank of the river on the Kaira Collectorate beyond it, where the ground is a light loamy soil, rather undulating, and with not many trees. The Gaikowar has a hunting lodge in the village. The extensive plain on which His Highness' annual hunts take place is about S.W. of Dubka, and is of the same nature as the plain N. of the river, but with the addition of large tracts of open ground frequented by numerous herds of antelopes."

## No. 3.

*Case of Plugging of the Abdominal Aorta. Gangrene of the Feet.*—By H. V. Carter, M.D., Acting Assistant Surgeon, J. J. Hospital.

Presented November 1859.

The patient was transferred from the clinical surgical ward with the following history. A Mussalman, *æt.* 32, an inhabitant of this island, and a beggar, was admitted into the J. J. Hospital on the 27th September 1859. There was more or less loss of sensation in both feet extending as high as the ankles. Both little toes were gangrenous, and on the left foot, the cuticle was raised into blisters at the outer side. No pulsation in either femoral artery. He attributes his complaint to exposure to cold and wet during the monsoon. Is an opium-eater, consuming about 6 grains a day. Five years since he had syphilis.

After his admission, the gangrene on the left side spread very rapidly: it was less extensive on the right side, but the foot became much swollen. The aspect of this patient, towards the end, was characteristic of great nervous exhaustion, and he was much emaciated: his whole appearance was an affecting picture of misery. Appropriate treatment was adopted—that of support by stimulants. Death occurred, November 3rd.

*Post-mortem examination.*—Commencing 3 inches from the bifurcation of the abdominal aorta and extending as high as the origin of the inferior mesenteric artery, the calibre of the vessel has been closed by a large coagulum of blood enclosed in a fibrinous layer which is rather firmly adherent to the walls of the vessel. The occluded portion of the abdominal aorta is above two inches in length. The vessels usually arising near the part cannot be seen in the specimen. The upper end of the coagulum is scooped out, as it were, and channelled so as to allow the current of blood to enter the superior mesenteric artery: the layer of fibrine is here well marked. The lower end of the coagulum was prolonged into a delicate process ending in a fine point; which soon broke off. Opacity and thickening of the inner coats of the vessel from effused lymph may be seen in two spots unconnected with the seat of disease. The walls of the aorta are somewhat thickened: the colourless layers of the clot can be readily peeled off from the inner coat of the vessel, and they are prolonged into the lumbar arteries at

the sides, closing them: they are upwards of a line in thickness in places, and thickest above. The central part of the clot appeared to communicate with the current of blood by a small aperture, but there was no current through the aorta at this part: water poured in from above did not pass into the lower end of the vessel.

The outer surface of the aorta appeared to be somewhat roughened as if from the effusion of lymph: but no redness was observed that could be attributed to inflammation.

There was no disease of the arterial tubes at any part, nor at the semilunar valves of the heart. The aorta was barely perceptibly narrower at the seat of obstruction than elsewhere; its general diameter appeared diminished below this, and above, somewhat enlarged. The iliacs and femorals with their continuations presented no morbid appearances, no obstruction being found even as low down as the posterior tibials at the ankle-joint. The thickening of the internal coat of the aorta near the seat of disease was owing to the formation of laminæ resembling the coat itself in structure, but whether they were on its free surface or not, was not made out.

The disease was probably chronic arteritis, localized at the part affected, and arising from internal causes; but there was wanting that contraction of the canal of the vessel, and constriction of its walls, apparent externally, which are characteristic of this affection. (*Edinburgh Medical and Surgical Journal*, vol. lxv, p. 148.)

The present case may be contrasted with a similar one recorded by Dr. Ballingall in these Transactions, No. III., New Series, Appendix.

The similarities are the young ages of the patients, and their intemperate habits;—both were great opium eaters. The duration of the disease in both cases was about 10 or 12 weeks. But the symptoms during life were different, the pain and tenderness in the course of the vessels appear to have been wanting in the present case, though well marked in that of Dr. Ballingall. In this last too there was no pulsation in the arteries of one side; the obliterated part was far more extensive, and the form of closure different,—and lastly ætheromatous patches were found in the walls of the vessel. Still the similarity was enough to warrant the supposition, made during life, that in this instance too arctation of the aorta might be found after death.

## No. 4.

*Case of Extraction of a Bullock's Horn introduced per anum into the abdominal cavity.*—By Assistant Surgeon W. G. Hunter, Acting Professor of Surgery, Grant Medical College.

Presented September 1859.

R. B., a young man, an imbecile, and a resident of Coorla, was admitted into Jamsetjee Jejeebhoy Hospital, about noon of 26th April 1859. It was reported that, in order to relieve some colicky pains to which he is subject, he had, the day previously, introduced a bullock's horn per anum into the abdomen, and that several attempts had been made by his friends to extricate the horn, but without success, in consequence of which he had been brought to the hospital. On examining the abdomen, the parieties in the right hypochondrium close under the margin of the ribs were observed to be pushed forward in a conical manner, to the extent of half to three quarters of an inch. A hard circumscribed body could be easily felt occupying the greater part of the abdominal cavity, and passing in a direction from above downwards with a slight inclination from right to left. A slight discharge of blood and mucous was observed taking place from the anus. On introducing the index finger about two inches up the rectum, a hard, ragged, and hollow substance was detected, and was made distinctly visible by an assistant dilating the gut with his fingers. The mucous lining membrane of the bowel was in a highly injected state, and covered with a gummy-looking mucous. Beyond very slight febrile excitement and a rather quick pulse (85), there were no signs of constitutional disturbance. The introduction of the horn, it was said, had been effected with but little difficulty, and the hœmorrhage had been trifling, not more than four ounces altogether.

Its removal was effected in the following manner :—The patient being placed under chloroform, the lower extremities were bent into the lithotomy position, and the buttocks brought to the edge of the bed. An assistant then well dilated the bowel by making traction on the *sphincter ani* with his fingers ; the horn was then seized with a pair of lithotomy forceps, but, as they readily slipped, a tooth forceps was substituted. Firm traction was then made in an undulatory manner, and

its extraction gradually accomplished. A wet pad and bandage were applied over the abdomen, thirty minims of tincture of opium exhibited, and milk diet ordered. During the first 50 or 60 hours, defœcation was preceded by, and accompanied with, a slight discharge of dark blood ; this however, gradually and steadily subsided, and the patient was discharged on the 6th day (1st May) perfectly well.

The horn after extraction was observed to be covered with a bloody mucous. It measures 11 inches in length, and is extremely rough from exposure ;—it having been picked up by the patient as it was casually lying on the road side.

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## No. 5.

*Notes on Panchgunny, near Mahableshwur.—Condensed from Mr. J. Chesson's Pamphlet on Hill Sanataria in Western India.*

Panchgunny is the name of an inconsiderable village situate in the Deccan, on a mountain range about ten miles east of Mahableshwur. The village is about four thousand feet above the level of the sea, and is built under a large extent of table-land, which shields it from the east wind. As seen from the public road, it is partially hidden from view in a grove of large and wide-spreading trees, covered with luxuriant foliage. The magnificent scenery of the valley of the Krishna, extending for many miles from east to west, with its numerous hamlets, highly cultivated fields, and broad river pursuing an irregular zigzag course through the valley, and the many little streams here and there running to magnify the waters of the Krishna, can be seen from the village, and from the whole northern ridge of the mountain. From the southern ridge, the view is even more picturesque, though less extensive. A walk along the hill-top in any direction continually diversifies the representation below, and charms the beholder. The extent of surface possessing the climate of Panchgunny, as distinguished from that of Mahableshwur, is about seven miles in length, and half a mile in breadth. There are many projecting bluffs, with level surfaces, especially suited for dwelling-houses. The surface soil, varying in depth from 6 inches to 3 or 4 feet, is for the most part a red clay common to Mahableshwur, while the sub-soil is either a grey or red-brown moorum. Water in sparkling purity is to be seen rushing, spouting, or trickling in many places from the rock, and in sufficient quantities throughout the year for agricultural and domestic purposes. Supplies of all kinds, such as sheep, poultry, eggs, vegetables, milk, fruit, and

grain, &c., are easily obtained, either from the surrounding villages, or from the large town of Waee in the valley below, to which there is a cart-road. These supplies are abundant and cheap.

The altitude of Panchgunny being four thousand feet, would naturally lead us to expect a low, bracing, and agreeable temperature, and from the subjoined tables it will be seen that the mean temperature throughout the year, as registered for a period of five years, was 69°. Once, in May, 1855, the maximum reached 96° just before a thunderstorm, when it almost suddenly sank to 86°, and two days subsequently, at 3 P. M., it was registered at 72° after a fall of rain. The minimum has been as low as 54°, but this temperature is almost too cold for India, when natives refuse to work, and Europeans find a fire on the hearth desirable. The mornings and evenings, with a mean temperature of 67°, makes out-door exercise pleasant, and the mean temperature at noon being about 71°, Europeans are not often prevented moving out during the day in consequence of the heat. The mean of the daily maximum has been 76°, and the mean of the daily minimum 62°. The wet-bulb thermometer has been registered only for three years, a period perhaps sufficient for all practical purposes. The mean temperature by this instrument was 63°, showing about 7° as the mean of evaporation: but in the dry month of April there has occasionally been shown 19° as the maximum of evaporation, while in the rainy months there is occasionally a saturated atmosphere.

The fall of rain has been carefully registered for more than four years, and the total fall during this period has been less than that at Mahableshwur during a single season. It will be seen by the Tables that the greatest fall of rain was registered during 1855-56, when nearly 52½ inches were gauged, the average fall being nearly 51½ inches. During the monsoon, out-door exercise can be continued and enjoyed without danger to health; agriculture proceeds as merrily as in the Deccan plains; tiled houses are inhabitable and are sufficient protection against the rain, and invalids may stay here with advantage. These are important facts, because hill stations generally are deluged with rain; house property is deteriorated from the long continued damp and wet; gardens are devastated by fogs and floods; and whilst people endeavour to leave the hills before the rains set in, the unfortunate inhabitants, compelled to remain, exist in an atmosphere saturated with moisture and thickened by fog, which impedes respiration, and renders the body susceptible of disease.

In considering the healthiness of Panchgunny, it must be explained that although the resident native population is small, still the tables

of diseases and deaths include all natives who have been sick, or who have died during the last five years, and are correct so far as they go. The natives of Panchgunny live in poverty at all times, and occasionally in destitution; it is not too much to infer that were they better fed and clad, the healthiness of the place would have been exhibited in a more satisfactory light than is shown in the tables. Many Europeans of both sexes, of various ages, and suffering from different diseases, have been resident here under medical treatment during the period embraced in the tables. One only died—a hopeless case of dropsy, depending on disease of the liver of old standing. All the rest have left in restored health. Children have improved wonderfully, by attention to regimen, &c.

The first remarkable feature in the table of diseases (at p. xxx.) is the absence of epidemic maladies, such as cholera, small-pox, &c., the scourges of most Indian towns and villages. The natives declare that cholera has never visited Panchgunny in their day, and I have not seen a case during my residence. Diseases of infancy and childhood are so rare that the deaths, with an average of about sixty children, were only three. One of these occurred in an idiotic child, enfeebled from imperfect development; another in a child of two years of age from the effects of a severe scald; the third was a case of croup, but not brought for treatment. Of the five adults who have died, two were from snakebite (phoorsa), two from remittent fever, and one from diarrhœa. The three latter were men of 55, 50, and 40 years of age, in whom the powers of life were enfeebled by poverty and neglect. Treatment was only applied for in one of these cases (remittent fever), but not till life was fast ebbing, and human efforts unavailing. Of the most numerous cases of disease not fatal there were besides 14 of catarrh, 78 of intermittent fever occurring repeatedly in the same individual, and contracted in other localities, but the majority of cases were of so trifling a nature as scarcely to require treatment. Applications for medical aid have been pretty general amongst the villagers, both here and in the other near villages, and their belief in the powers of medicine as practised by European art, has been great. Vaccination has been twice extended to this place within the memory of the oldest inhabitant. About twenty years ago a Portuguese was sent from Mahableshwur, and about eight years subsequently a Brahmin vaccinator appeared in the village. Many of the surrounding villages are very similarly circumstanced, natives (not vaccinators) go round the villages, performing the operation of inoculation by making incisions on the forearm with a razor, and inserting the matter of small-pox into the

wounds. There are several cases, the victims of this barbarous practice, now in this village.

There has been a steady increase of population during the last four years: and also an addition to the number of dwellings. I may observe that there have been several purchases of land made by Europeans already, and that the lands so bought are held on "Meerasee" tenure, or perpetual proprietory. The tenants pay a small annual tax to Government, amounting from half a rupee to four rupees per beega of 3,900 square yards. Land is now rising in value, and late purchases have been made at double the sum per beega at first paid. Building material is at hand; timber can be purchased cheaply, such as jack, mango, and other country woods. About a dozen building sites have been secured, and some dwelling houses commenced. Stone is very abundant over the whole place, and cheaply procured. Lime of superior quality can be procured at a moderate price from Waee; and tiles, superior in quality to those imported into Bombay, are to be had here at a very cheap rate. Labour, too, is cheap; water is plentiful, and every property has its own springs. It will be at once apparent that from the nature of the soil, the moderate fall of rain, and the good supply of water during the whole year, the produce of the orchard and the vegetable garden can always be depended on without much trouble or expense. Agricultural operations may be conducted on any scale, and with satisfactory results; and, in conclusion, I may remark that the people of this and the surrounding villages are tractable, peaceable, civil, and willing to work.

*Mean Register of the Thermometer at Panchgunny for five years.*

| Months. | Sunrise. | 10 A. M. | 1 P. M. | 4 P. M. | Sunset. | 8 P. M. | Maximum. | Minimum. | Mean. |
|---|---|---|---|---|---|---|---|---|---|
| January | 62° | 66° | 69° | 69° | 67° | 66° | 75 | 58° | 67° |
| February | 65 | 68 | 73 | 73 | 71 | 70 | 79 | 61 | 71 |
| March | 71 | 73 | 76 | 76 | 74 | 73 | 82 | 64 | 74 |
| April | 72 | 76 | 79 | 79 | 76 | 75 | 86 | 68 | 76 |
| May | 73 | 77 | 80 | 80 | 76 | 75 | 86 | 68 | 77 |
| June | 66 | 69 | 71 | 70 | 68 | 68 | 78 | 65 | 69 |
| July | 65 | 66 | 67 | 66 | 66 | 66 | 70 | 65 | 66 |
| August | 64 | 65 | 66 | 66 | 65 | 65 | 69 | 63 | 66 |
| September | 63 | 65 | 67 | 66 | 66 | 64 | 71 | 61 | 65 |
| October | 64 | 64 | 70 | 70 | 68 | 67 | 74 | 62 | 68 |
| November | 62 | 65 | 68 | 69 | 67 | 66 | 73 | 58 | 67 |
| December | 60 | 64 | 67 | 67 | 66 | 65 | 72 | 56 | 65 |
| Mean | 65 | 69 | 71 | 71 | 69 | 68 | 77 | 62 | 69 |

*Mean Register of the Wet Bulb Thermometer at Panchgunny for three years.*

| Months. | Sunrise. | 10 A. M. | 1 P. M. | 4 P. M. | Sunset. | 8 P. M. |
|---|---|---|---|---|---|---|
| January | 56° | 59° | 61° | 61° | 61° | 61° |
| February | 57 | 59 | 61 | 61 | 62 | 63 |
| March | 60 | 61 | 65 | 65 | 64 | 64 |
| April | 62 | 65 | 67 | 67 | 66 | 64 |
| May | 64 | 67 | 69 | 70 | 68 | 67 |
| June | 65 | 67 | 68 | 67 | 66 | 66 |
| July | 64 | 65 | 66 | 66 | 65 | 64 |
| August | 63 | 64 | 65 | 64 | 64 | 64 |
| September | 61 | 64 | 65 | 65 | 63 | 63 |
| October | 61 | 63 | 64 | 64 | 64 | 63 |
| November | 59 | 59 | 61 | 61 | 61 | 60 |
| December | 54 | 58 | 59 | 60 | 60 | 59 |
| Mean | 60·6 | 62·9 | 64·3 | 64·3 | 63·8 | 63·2 |

*Register of Pluviometer at Panchgunny from June 1855 to May 1859.*

| Months. | 1855-56 | | 1856-57 | | 1857-58 | | 1858-59 | | Total. | | Average. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I. | c. | I. | c. | I. | c. | I. | c. | I. | c. | I. | c. |
| June | 6 | 5 | 4 | 15 | 10 | 0 | 7 | 93 | 28 | 13 | 7 | 3 |
| July | 21 | 35 | 23 | 92 | 6 | 7 | 18 | 67 | 70 | 1 | 17 | 50 |
| August | 2 | 61 | 8 | 95 | 19 | 49 | 7 | 7 | 38 | 12 | 9 | 53 |
| September | 8 | 17 | 4 | 76 | 5 | 66 | 4 | 7 | 22 | 66 | 5 | 66 |
| October | 9 | 30 | 2 | 3 | 1 | 44 | 7 | 27 | 20 | 4 | 5 | 1 |
| November | 0 | 2 | 0 | 48 | 1 | 37 | 1 | 96 | 3 | 83 | 0 | 95 |
| December | 1 | 13 | 1 | 43 | .. | .. | .. | .. | 2 | 56 | 0 | 64 |
| January | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| February | .. | .. | .. | .. | 0 | 6 | .. | .. | 0 | 6 | 0 | 1½ |
| March | 0 | 48 | 0 | 4 | 0 | 4 | .. | .. | 0 | 56 | 0 | 56 |
| April | 1 | 11 | 0 | 44 | 0 | 75 | 5 | 15 | 7 | 45 | 1 | 86 |
| May | 2 | 21 | 2 | 84 | 7 | 39 | 0 | 84 | 3 | 28 | 3 | 32 |
| Total | 52 | 43 | 49 | 4 | 52 | 27 | 52 | 96 | 206 | 70 | 52 | 7½ |

*Register of Pluviometer during the Monsoon Months of 1855, 1856, 1857, 1858, and 1859.*

| Months. | 1855 | | 1856 | | 1857 | | 1858 | | 1859 | | Total. | | Average. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | I. | c. | I. | c. | I. | c. | I. | c. | I. | c. | I. | c. | I. | c. |
| June | 6 | 5 | 4 | 15 | 10 | 0 | 7 | 93 | 7 | 78 | 35 | 91 | 7 | 18 |
| July | 21 | 35 | 23 | 92 | 6 | 7 | 18 | 67 | 23 | 18 | 93 | 19 | 18 | 64 |
| August | 2 | 61 | 8 | 95 | 19 | 49 | 7 | 7 | 7 | 49 | 45 | 61 | 9 | 12 |
| September | 8 | 17 | 4 | 76 | 5 | 66 | 4 | 7 | 6 | 35 | 29 | 01 | 5 | 80 |
| October | 9 | 30 | 2 | 3 | 1 | 44 | 7 | 27 | 0 | 33 | 20 | 37 | 4 | 7 |
| Total | 47 | 48 | 43 | 81 | 42 | 66 | 45 | 1 | 45 | 13 | 224 | 09 | 44 | 81 |

*Table of Diseases and Deaths amongst the Native Inhabitants of Panchgunny for five years.*

| Diseases. | 1854-55. | | 1855-56. | | 1856-57. | | 1857-58. | | 1858-59. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Treated. | Died. | Treated. | Died. | Treated. | Died. | Treated. | Died. | Treated. | Died. | Treated. | Died. |
| Abscess | .. | .. | 1 | .. | .. | .. | 1 | .. | 1 | .. | 3 | .. |
| Atrophy | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 |
| Bronchitis | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. |
| Catarrh | 1 | .. | 1 | .. | 4 | .. | 6 | .. | 2 | .. | 14 | .. |
| Colic | 3 | .. | 3 | .. | 1 | .. | 1 | .. | 1 | .. | 9 | .. |
| Constipation | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 2 | .. |
| Croup | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 |
| Curved Spine | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. |
| Diarrhœa | 4 | .. | 5 | .. | .. | .. | 6 | .. | 2 | 1 | 17 | 1 |
| Disease of the Elbow joint | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. |
| Dysentery | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. |
| Ear-ache | .. | .. | 2 | .. | 4 | .. | .. | .. | 1 | .. | 7 | .. |
| Fever Intermittent | 15 | .. | 23 | .. | 21 | .. | 7 | .. | 13 | .. | 79 | .. |
| „ Remittent | 3 | .. | 3 | 1 | 2 | 1 | .. | .. | 2 | .. | 10 | 2 |
| Fracture of Leg | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. |
| Gonorrhœa | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | 2 | .. |
| Guinea-worm | .. | .. | .. | .. | .. | .. | 2 | .. | .. | .. | 2 | .. |
| Head-ache | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | .. |
| Inflammation of Liver | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. |
| Mumps | .. | .. | .. | .. | 2 | .. | .. | .. | .. | .. | 2 | .. |
| Ophthalmia | 1 | .. | 5 | .. | 5 | .. | 9 | .. | 3 | .. | 23 | .. |
| Paralysis | 1 | 1 | .. | .. | 2 | .. | .. | .. | .. | .. | 3 | 1 |
| Premature Birth | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 |
| Rheumatism | .. | .. | 1 | .. | 3 | .. | 2 | .. | 1 | .. | 7 | .. |
| Scald | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 1 | 1 |
| Snake-bite | 1 | 1 | .. | .. | .. | .. | 1 | .. | 2 | 1 | 4 | 2 |
| Sore Throat | .. | .. | .. | .. | 1 | .. | 2 | .. | .. | .. | 3 | .. |
| Syphilis | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. |
| Ulcers | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | 1 | .. |
| Total | 31 | 2 | 46 | 1 | 51 | 1 | 39 | .. | 32 | 6 | 199 | 10 |

*Number of Inhabitants and Dwellings, at Panchgunny, on the last day of May for five years.*

| | 1855 | 1856 | 1857 | 1858 | 1859 |
|---|---|---|---|---|---|
| Men | 34 | 38 | 38 | 46 | 46 |
| Women | 47 | 45 | 47 | 48 | 53 |
| Children | 64 | 53 | 63 | 56 | 63 |
| Total | 145 | 136 | 148 | 150 | 162 |
| Dwellings | 21 | 25 | 31 | 32 | 32 |

## No. 6.

*Case of General Paralysis from Caries of the Vertebræ.*—Treated and reported by Sub-Assistant Surgeon Edulјee Nusserwanjee in the Jamsetjee Jejeebhoy Hospital.

Presented by J. Peet, M.D., Vice-President.

Chand, a sailor, aged 30, who was for some days under treatment for pain in the shins of both legs, and spinous processes of the upper dorsal vertebræ (looked upon as syphilitic), suddenly complained one evening of increased sensibility of the scalp, and inability to get up in bed without assistance; skin was hot and the pulse was small, soft, and quiet. Some relief was obtained by applying cold water to the head. At bed-time, thirty minims of the solution of muriate of morphia were given, as prescribed some days previously. During the night he appears to have lost all sensation and power of motion in the limbs. The muscles were flaccid; the sphincters were relaxed; the sensibility of the scalp was increased, and in the morning he complained much of deep-seated pain in the whole head. No reflex action could be excited by tickling the soles of the feet. Speech, deglutition, and respiration were unaffected; skin natural; pulse small and weak (84). The pathology of the disease was perfectly obscure. The head was, however, shaved, and a blister applied over it. An enema of castor oil and turpentine, 3 oz. of each, with warm water 1 pint, was also given. When visited in the afternoon, at 4 P. M., he was found dead in bed.

A *post mortem* examination was made 17 hours after death.

*Head.*—The membranes were quite healthy. The vessels on the surface of the brain were somewhat congested. There was no effusion at all, either at the base, or between the membranes and the cranium. The substance of the brain was natural everywhere; no abnormal collection of fluid in the ventricles, no hœmorrhage, no abscess.

*Spinal Canal.*—While opening the canal by dividing the arches of the vertebræ, in the upper part of the cervical region, a quantity of pus streaked with blood came out. After removing the arches, pus was seen in the canal, and in it there were two small loose granules of bone. After clearing the pus with a sponge, the dura mater was seen quite entire, nay, somewhat thickened opposite the spine of the axis. The substance of the cord was healthy. The transverse ligament of the atlas was entire. The odontoid process of the axis, and some

portion of the bone to the left of it, were carious. The process was separated from the body in the act of opening the canal.

The paralysis and death in this case seem evidently to depend upon the pressure of the abscess over the cord. The increased sensibility of the scalp was probably due to irritation of the occipital nerve, and pressure upon it before its exit from the spinal canal.

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## No. 7.

*A report on Epidemic Cholera, which prevailed at Aden during the month of October* 1858.—By Sub-Assistant Surgeon Ruttonjee Hormusjee, in Medical charge, Engineer Department, Aden.

Presented by the Director-General Medical Department.

Ever since this station has been taken possession of by the British, cholera, in its genuine epidemic form, was unknown till the late outbreak. There were, however, undoubted cases of the disease now and then seen; but then they were single solitary cases. Two such cases have occurred under my own charge within the last three years. It is also believed that, in the year 1845, there was some degree of semblance to diffused cholera, but it lasted only for three or four days.

Amongst the labourers of the Engineer Department, the first case of epidemic cholera occurred late in the evening of the 29th September 1858, in a female; the vomiting and purging continued throughout the night, and she died early in the morning. This being the first case of the kind, it was suspected to be a case of irritant poisoning; all doubts of its nature were, however, removed by the occurrence of a similar case on the same morning amongst the biggaries, as well as the sepoys. The disease, thus dating, increased rapidly, and in three or four days, it attained the greatest severity. About the 8th October, the number of admitted cases began to fall, and the disease itself showed a more amenable character: it then lessened. From 14th October no fresh case was admitted into hospital till the 28th, on which day a solitary case occurred in a girl, which, however, proved fatal as she was brought to the hospital in a far advanced stage of the disease.

It has been on former occasions pointed out, that the general tendency of the constitution of the labourers at Aden was asthenic; that this state was brought about by poor living, consisting of scanty

food, insufficiency of good water, defective residence in lowly constructed and crowded huts, filthy habits, and uncleanliness of every description. To these I would add, with reference to the men living in the Koosaff valley, the proximity of the open privy ground, which is made on the side of the valley towards the huts, it being to them a source of foul emanations. With reference to the exciting cause, there could be no doubt of the existence of a specific poison in the atmosphere, but how it happened to be present in the atmosphere of this peninsula, is a difficult and at the same time an interesting subject to inquire into. All that can be stated with certainty is, that long before the epidemic showed itself at Aden, cholera raged terribly along the Arabian coast of the Red Sea; it caused ravages at Mecca, Lohea, Hodeda, Mocha; it has also been said to have been very prevalent at Massowah. From these ports, buggalows, with goods of merchandize, were continually arriving at Aden. A ship also anchored in the harbour from Mecca, bringing a large number of pilgrims, and it is said that out of these pilgrims, two of the crew died of cholera, as the ship approached Aden. No instance of the disease, however, was known to have occurred amongst them since the date of anchorage here. From these facts it is very probable, nay even almost certain, that the poison of cholera was imported into Aden from some of the neighbouring places. After the epidemic broke out at Aden, it made its appearance at Lahadge and Berbera, so that certain ports on the Red Sea, carrying on a regular trade with Aden—viz. Mocha, Hodeda, Jedda, Lohea,—suffered from cholera first of all; the disease appeared next at Aden; whilst Aden itself communicated freely with Lahadge and Berbera, where the disease was last of all seen. All this, then, would appear to support the idea of the communicability of cholera poison by human intercourse.

Before the eruption of cholera, the state of the atmosphere was highly favourable for the development of unusual sickness; the hottest part of the year was just closing—the temperature varying from 80° to 98°,—the nights were close and unsufferable, and, at an early part of the morning, there was a fall of dew.

The number of cases admitted from the Engineer Department was 115; of these 103 were males, 8 females, and 4 children. Out of these there were 75 deaths, namely 69 amongst the males, 4 amongst the females, and two children. These numbers, therefore, give a mortality of 65·2 per cent. to the treated. Besides the labourers of the Engineer Department, 17 sepoys of the 29th Regiment N. I., and three Somalees and one sowar of the Sind Irregular Horse have also

received treatment in this hospital, making a total of 21 treated; amongst these, ten deaths have occurred, giving a mortality rate of 47·6 per cent. The result of treatment, therefore, in these two sets of men, shows a difference; the former gave 34·8 per cent. recoveries, whilst the latter gave 52·4 per cent. The cause of this difference will be alluded to hereafter. The total of all the cases treated is 136, and 85 deaths; or a mortality of 62·5 per cent, and recoveries 37·5 per cent.

*Symptoms.*—There were three stages in the symptoms of the disease. *In the 1st stage*, the patient was suddenly seized with vomiting and purging; both symptoms continuing together, sometimes the one, sometimes the other predominating; the vomited matters were first of all the contents of the stomach; they soon, however, became watery, slightly tinged now and then, and at last quite colourless; they were often passed in large quantities, and with a force as if they were pumped out. The matters ejected from the bowels were first tinged, and contained bile; they soon became watery, and passed with some degree of force. The skin still maintained its temperature, although somewhat reduced; the pulse was distinct, although feeble. When this state of matters continued for three, four, or five hours, the disease passed on into *the 2nd Stage, or that of Collapse.* The purging and vomiting continuing, a portion of the watery part of the blood was thus removed from the circulating system; the action of the vascular system failed, leading to reduced temperature of the skin, which slowly became cold and covered with moisture; the pulse became smaller and smaller, and at last imperceptible. Tongue also became cold, although nothing else excepting a thin fur could be seen on it. The functions of secretion became suspended; bile no longer passed into the alimentary canal, and therefore the dejections soon became whitish, and of the characteristic appearance of rice-water; urine became suppressed. A distressing symptom now made its appearance, namely the spasm or cramps of the extremities, but most frequently seen in the calves of the legs; often in the thighs; oftener in the upper extremity, extending down to the fingers. This was a very painful symptom for the sufferers to bear, and there could be no doubt that it exerted a powerfully sedative influence on the heart and nervous system. This spasm showed itself now and then in the diaphragm; the patient complained of cramp-like pain in this situation. In other cases, there was merely a sense of burning in the epigastrium. Thirst was greatly felt. Another distressing symptom, many of the patients complained of, was the distention of the abdomen; and although there

was some degree of clear sound on percussion, the abdomen did not appear so distended as the feelings of the patients seemed to indicate. As the case advanced, and although the general surface became cold and covered with cold moisture, the patients often complained of burning sensation all over, and begged for a free circulation of air around the cot, and especially to be fanned. As the blood became reduced in quantity, the features became shrunk, the eyes became embedded in the sockets. If the disease still progressed unfavorably, the breathing became hurried, and the patient died, the intellect remaining quite clear till the last. *3rd Stage.*—If, however, a fatal termination was not brought about, the patient either slowly recovered without any further abnormal symptoms; the secretions of urine and bile gradually became established; the temperature of the skin returned, with distinctness of the pulse at the wrist. Or this state of reaction proved excessive in a few cases, and thus fever, cerebral complication, gastro-enteritis, dysentery and pulmonic complications arose.

During the course of the epidemic, I carefully kept an account of the several complications, and the following is a synopsis of the 136 cases treated, of which 51 recovered and 85 proved fatal:—

| | | |
|---|---|---|
| 1. | Cases which recovered without any secondary complications, and under the use of mild restoratives of the secretions, viz. mercurials and diuretics, and often without the aid of these means ..... | 48 |
| 2. | Cases which proved fatal in the stage of collapse, and before there was any time for secondary complications to arise ..... | 76 |
| 3. | Cases in which secondary complications took place .... | 12 |
| | Total..... | 136 |

The complications were as follows:—

| | Died. | Recovd. | Total. |
|---|---|---|---|
| Fever and cerebral complications..... | 3 | 0 | 3 |
| Cerebral complication alone ..... | 4 | 0 | 4 |
| Cerebral complication and gastro enteritis. | 1 | 2 | 3 |
| Pulmonic complication ..... | 1 | 0 | 1 |
| Dysenteric complication ..... | 0 | 1 | 1 |
| Total. ..... | 9 | 3 | 12 |

Amongst 51 cases which recovered, 48 got well, the heat of skin and pulse slowly developed themselves, and the secretions became restored; in the other three cases, symptoms of secondary complications arose, such as are described below. In three cases, the reaction was marked by febrile excitement and head symptoms, which showed themselves first of all by a slight vascularity of the conjunctivæ, the speech faltered, and the tongue became drawn in; these were insidiously followed by drowsiness; the patient then became unable to answer any questions; drowsiness still increased, followed by coma and death. In the two cases where the head symptoms were recovered from, the drowsiness gradually became lessened. In them, there was also some degree of gastro-enteric irritation, shown by hiccup, redness of the tongue at its edges, some degree of tenderness on pressure of the epigastrium, some degree of vomiting after the reaction was restored. In one case, in which pulmonic complication arose, the symptoms came on from exposure to cold. A boy was admitted at the very commencement of the epidemic in the collapsed stage of cholera, from which he recovered, and reaction became fairly restored, when his parents entreated that he might be allowed to be taken home, which was granted; but they soon brought him back with difficulty of breathing, sibilous and sonorous rales, with subcrepitus; there was also slight crepitus in the posterior regions of the chest. These symptoms increased and proved fatal. The symptoms in the case of dysenteric complication also arose from cold.

*Treatment.*—When the disease was seen in the 1st stage, *i. e.* when the discharges from the stomach and bowels were commencing, 20 minims of tincture of opium were given with or without ammonia, according to the state of the skin and pulse. This was repeated in half an hour, or an hour. Having had no confidence in the efficacy of astringents, such as the acetate of lead, pulv. kino. comp., &c. &c. in this stage of the disease, I chiefly trusted to opium. Where vomiting appeared more violent, a large sinapism was applied to the epigastrium, and kept on for half an hour, or more if it was borne. Then the patient had warm clothing, and external warmth was applied to the various parts of the body by means of bricks. But, unfortunately, a large proportion of the cases passed on to the second stage of the disease. In the management of this stage, where the collapse was fairly formed and was advancing, the following physiological facts were borne in mind: that the functions of the vascular system being so much depressed, it was not to be expected that absorption would go on to any great

extent from the surface of the stomach ; this being the case, remedies were withheld, which, by their accumulation in the alimentary canal, might lead to injurious effects when the function of absorption was restored, and reaction took place. The remarks apply to the use of opium and mercurials. When it was determined that two or three doses of laudanum, combined with other means, were not sufficient to check the disease, which was evidently passing into complete collapse, further exhibition of opiates was withheld; stimulants were more assiduously resorted to ; liq. ammoniæ or spiritus ammoniæ aromaticus, or alcoholic stimulants in the shape of brandy, two or three drachms, were given every hour ; sinapisms to the epigastrium were repeated; the excessive thirst was met by a free allowance of water. A large vessel, constantly filled with fresh water, was placed in the centre of the ward, and every attending man was directed to make use of it as often as the patients wished to drink ; moreover, where the desire was not shown, the water was swallowed greedily when presented to the patient. In other instances, where a degree of burning sensation was complained of in the stomach, limejuice was given, sweetened with sugar. The external warmth was constantly applied by means of hot bricks; nourishment was given in the shape of sago, often mixed with brandy ; distention of the stomach was sought to be relieved by the oil of turpentine, which was given both internally and by enemata, but apparently with little good. Cramp would seem to be much relieved by shampooing, which the patients themselves instinctively prescribed. This line of treatment was continued, till either reaction was induced, or a fatal termination happened, which was the result in, unfortunately, too many instances. During the height of the disease, namely from 3rd to 7th October, the stage of collapse often ended in death in the course of three or four hours. When, however, there were symptoms of approaching reaction, the use of stimulants was relaxed, external warmth was still continued, with nourishment, and the restoration of secretion of bile and urine was watched over. When there was reason to believe that these secretions were unduly delayed, diuretics, consisting of nitrate of potash and spirit of nitric ether, and a ten-grain dose of calomel, were given. Where this large dose of calomel was not necessary, only half that quantity, or five grains of blue pill, were substituted. In a few instances it was necessary to repeat a second ten-grain dose of calomel, and under this treatment the secretions became restored. A dose of castor oil was in some cases thought necessary.

When the stage of reaction extended beyond its healthy limit, a febrile heat of skin was noticed, and then the several secondary complications developed themselves. The first symptom of cerebral complication that attracted attention, was vascularity of the conjunctivæ; this was soon followed by a faltering or defective speech, retraction of the skin, drowsiness, dried tongue, and coma. This train of symptoms was met, first of all, by a full dose of calomel, with castor oil and turpentine; or the latter were presented in the form of enema: leeches to the temples, from one to four dozen, and even, in one case, general blood-letting, was used to the extent of twelve ounces. Afterwards blisters, either to the neucha, or to the whole scalp in several cases were applied. But in order that this treatment may prove effectual, it is necessary to watch carefully the very first symptoms of this complication, namely, the injected conjunctivæ, and imperfect speech; and it is my belief, that if these symptoms were passed over, and drowsiness fairly set in, the treatment would be of very little use indeed. I may observe that when gastro-enteric symptoms were present, leeches to the epigastrium, and effervescing draughts gave relief, whilst pulmonic and dysenteric complications were treated in the ordinary manner.

A curious *post mortem* appearance may now be described. On the 3rd October, a miner, M. L., died collapsed. In about half an hour after the corpse was removed amongst the other dead men, I was surprised to see a curious gentle motion of one of the limbs; the corpse was covered with a cumblee, but the shake was distinctly seen through it. I immediately removed the corpse from the others, and observed that, for about quarter of an hour, there were slight twitchings and quiverings, only to be seen when quite close, about the chin, over the left clavicle, and in one or two fingers of the left hand.*

Shortly after the epidemic appeared, a judicious step was taken by the authorities, in removing from the place where they were attacked, the sepoys and biggaries, and placing them in tents in a scattered manner—the biggaries over the mala, and the sepoys partly at the Sind Irregular Horse lines, and partly at Steamer Point; and this step was attended

* At page 521 of the 2nd Volume of Dr. Watson's Lectures, this *post-mortem* appearance is thus described:—"And another most singular phenomenon was occasionally remarked in the dead body. A quarter or half an hour, or even longer, after the breathing had ceased, and all other signs of animation had departed, slight tremulous twitchings and quiverings and vermicular motions of the muscles would take place, and even distinct movements of the limbs, in consequence of these spasms."

with the happiest result. It has been before stated that amongst the biggaries, there were only 34·8 per cent. of recoveries, whereas amongst the sepoys there were 52·4 per cent. recovered. The difference is easily explained. Out of 115 admissions, including men, women, and children, which took place amongst the biggaries, so many as 108 were from the Koosaff valley, in town. Between this valley and the native military general hospital, there lies the whole range of Door-Bel-Hosh; the men attacked were therefore carried in a dooly across this hill before they reached the hospital, and in this way much valuable time was lost; the patients were brought for treatment when the disease had much advanced. On the other hand, the chief admissions amongst the sepoys took place from the detachment of the 29th Regiment N. I., stationed over the Isthmus, namely where the hospital is situated; the men were, therefore, able to present themselves in an earlier stage, and therefore the general result of treatment was much more favourable.

In concluding this report, I would allude to the almost universal belief, amongst the native population, in the existence of the *Comet* as the cause of cholera. The belief, however absurd it may be, was engendered in their minds by the fact of the appearance of this body in the heavens at the time of the breaking out of the epidemic, and further that its luminosity kept pace, to a certain extent, with the progress of the disease.

*Return of Cases of Cholera treated in the Native General Hospital, Aden, in the month of October* 1858.

| | *Engineer Dept.* | *29th Regt., &c.* |
|---|---|---|
| Admissions..... | 115 | 21 |
| Discharged..... | 40 | 11 |
| Died ..... | 75 | 10 |

| October. | 1st. | 2nd. | 3rd. | 4th. | 5th. | 6th. | 7th. | 8th. | 9th. | 10th. | 11th. | 12th. | 13th. | 14th. | 15th. | 16th. | 17th. | 18th. | 28th. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Admissions..... | 5 | 17 | 21 | 18 | 32 | 15 | 10 | 6 | 4 | 4 | 1 | 1 | 1 | .. | .. | .. | .. | .. | 1 | 136 |
| Deaths..... | 0 | 6 | 15 | 13 | 16 | 15 | 7 | 1 | 4 | 2 | 2 | .. | 1 | .. | .. | .. | 1 | .. | 1 | 85 |

## No. 8.

*Fatal results consequent upon the application of Irritant Poisons externally.*—By Assistant Surgeon J. Mills, Superintendent of Vaccination, South Deccan Division.

On the 22nd of December 1858, whilst encamped near Badamee, in the Belgaum Collectorate, I received from the Foujdar a list of articles which had been employed in the composition of a poison that had been applied to a man in the village of Parwutee, about nine miles distant from my camp. I was requested to state whether the articles mentioned where really poisonous or not; but as only the Canarese names were given, I was unable to afford the desired information. On the following morning the Foujdar brought over the man to my camp, and I had an opportunity of judging for myself whether the materials, stated to be poisonous, were really so. The man to whom they had been applied was lying in a native dooly, unable to move. On removing the coverings from his head and shoulder, I could hardly believe it possible that strong mineral escharotics had not been applied. The injury had been inflicted on the night of the 16th, that is, six days before I saw the case. The poisoner having found his victim sleeping, had poured the poison over the left side of the head, face, neck, and a portion of the chest. Wherever it fell the skin was entirely destroyed, and a deep black slough was formed; the eye was quite closed, hearing of the left ear lost, and the poor fellow presented a most lamentable spectacle ; a small quantity of the poison had fallen on the left instep, and there a similar deep slough was formed. The patient was very weak, with difficulty roused or induced to swallow ; but his pulse, though weak, was quite regular. I gave him some internal stimulants, and a lotion of lead and opium, to be kept constantly applied to the wounds, and he was taken back to his village. On the following day, the 24th, I moved my camp to Gooladgood, and pitched close to the village of Parwuttee. The same afternoon I saw the man, and found him decidedly better; the slough was coming away healthily, the eyelids were separating, and the sight was not destroyed. The hearing was in some degree restored, his pulse was stronger, and he took more notice of what was going on around. Finding him in a wretchedly small room without any ventilation, I begged he might be moved into better quarters, or at least might be placed, during the day, under the shade of a noble tree just outside his door, for the smell from his wound was most offensive. I replenished his medicines, and left him. On the 27th and 29th I again saw him,

and left him going on as favourably as possible under the circumstances in which he was placed. I again renewed his medicines, and repeated my injunctions as to fresh air and cleanliness; but these were, I fear, neglected as soon as my back was turned. On the 30th I left the neighbourhood, but I subsequently heard from the 1st Assistant Collector in charge of the district, that the man continued to do very well until the 10th of January 1859, after which time he sank, and died on the 20th.

I received from the Foujdar of Badamee a list of the ingredients which I forwarded to Dr. Gibson, who informed me that the woods used in the preparation of the poison were,—

1*st.*—The root of the white oleander *Nerium Odorum*, very poisonous.

2*nd.*—The root of the *Plumbago Zeylanica*, very poisonous, immediately acting as a severe blister.

3*rd.*—*Semecarpus Anacardium*—the well-known marking nut—a powerful irritant. In addition, there were sulphate of copper, beetles (genus *Milabris*), and a snake, which, from the *rirâ voce* description given by the Foujdar, appears to have been an *amphisbæna*;—but upon this point my information is defective, as I was unable to procure a specimen.

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## No. 9.

*Cases of Aneurism occurring in H. M.'s 1st Bombay European Regiment (Fusiliers), reported by* Surgeon Costelloe, *M.D., and* Assistant Surgeon Straker.—Abridged, more or less, from the official diaries by the Secretary.

### No. 1. *Aneurism of the Pulmonary Artery.*

Private J. B., age 30; in India 10 years; admitted 22nd March 1859. A stout, well-made man, of temperate and active habits, was frequently attacked at Umritsur with shortness of breath, and irritability of stomach. These attacks were transient. Shortly after his arrival at Mooltan, he became worse, and was admitted into hospital, complaining of severe oppression, inability to sleep, and lowness of spirits. He was frequently examined, but no symptoms indicating disease of the heart could be detected, till the 30th of March, when, after being made to walk fast, a slight bellows sound could be heard towards the base. He left hospital and proceeded with the left wing to Kurrachee, and was

admitted into Hospital on the 28th of April, complaining of great weakness, with a shooting pain towards the top of the right shoulder, great irritability of stomach, rejecting his food immediately after it is taken ; countenance puffy,—lips swollen,—respiration hurried. He also complained of a fixed pain about the epigastrium which had existed for a long time to a greater or less extent. Pulse 90, moderate volume, compressible. On auscultation a bruit is heard, the first and second sounds are obscured. He was ordered 2 minims of hydrocyanic acid in one ounce of camphor mixture three times a day, and to have two ounces of brandy in two doses with soda water. On the 30th, the action of the stomach being quieted but the oppression increasing, a blister was applied to the region of the heart. On the 1st March the oppression having become more severe—the pulsation in the vessels of the neck becoming marked, and œdema of the lower extremities supervening, the stomach still remaining irritable,—eight minims of tincture of digitalis with one minim of hydrocyanic acid were ordered 3 times a day,—the dose of digitalis to be gradually increased to 10 minims, and his lower extremities rubbed with a liniment of tincture of squills and soap liniment. The œdema still continued to extend, and the pulse having become small and feeble, and the urine small in quantity, the tincture of digitalis was omitted, and on the 11th small doses of jalap, nitre, and camphor were substituted, and a draught with 30 minims of tincture of muriate of morphia given at bed time. On the 18th, the œdema rapidly increasing, and the pulse becoming more firm and of better volume, 10 minims of the tincture of digitalis combined with one drachm of spiritus ætheris nitrici and 15 minims of tincture of opium, were ordered to be given at bed time, and a solution of bitartrate of potash as drink. On the 28th, the scrotum becoming enormously distended and painful, the cellular tissue was incised, which gave issue to a constant flow of serum. He now rapidly became weaker, the stomach irritable, rejecting all food and medicine, and he gradually sank, expiring at 6 A.M. on the 3rd of June 1859.

*Post-mortem examination six hours after death.*—The subcutaneous areolar tissue of the legs, scrotum, abdomen, and upper extremities were much distended by serous effusion ; the face and chest were not affected, some late scarifications on the scrotum appeared to be getting into a sloughing condition. A good deal of serous fluid in the abdomen. The viscera being carefully removed, the aorta was traced upwards into the chest to its origin, and found not to have been the seat of a tumour. On opening the pericardium, the heart, on which

was a large patch of lymph, was seen to be enlarged to nearly twice its natural size, the enlargement being chiefly, if not wholly, on the right side, the auricle being most increased in size. The walls of the right ventricle were thickened by hypertrophy, to more than the usual thickness of the left ventricle. The valves of the pulmonary artery were healthy, but very thin, and felt hard. On tracing up the vessel, just outside the attachment of the pericardial bag, a dilatation was found about the size of an egg, the increase of calibre being gradual, from the cardiac side, but ceasing abruptly above. There was no lesion of the arterial walls, but they were whiter and thicker than normally, and had plates of cholesterine scattered over the internal coat. All other organs appeared healthy, the pancreas and spleen being rather soft and feeble. The kidneys were enlarged but healthy.

No. 2. *Aneurism of the abdominal aorta.*

Private M. D., age 40; in India 20 years; admitted 18th April 1859. He was suffering from pain in the loins, and frequent and painful micturition. Urine was of ordinary density, and without albumen. The pain was relieved for a time, but afterwards recurred in severe paroxysms, and he began to lose strength. On the 2nd July a peculiarity of pulse was noticed, the beat was very strong and jarring. He died suddenly, without any more marked symptoms, on the evening of the 17th July.

*Post-mortem appearances 14 hours after death.*—General appearance of the body emaciated; face careworn; posterior surface of body much discoloured and congested. On opening the abdomen, the omentum was found very thin, free from fat, and descending down to the pubis; intestines healthy; liver superiorly and posteriorly extensively adherent to the diaphragm, weight 4 lbs. 5½ oz., substance very friable, and of a light cinnamon colour, concave surface greenish, and discolored; gall bladder full; spleen healthy. On removing the liver and spleen, the kidneys were seen lying on what appeared a large mass of thick cellular tissue: on examination, the cortical substance was found paler than natural, not so firm as in health, their surfaces were mottled and lobulated, but no appearance of fatty degeneration existed, —the weight of the left kidney was 5½ oz., that of the right 7 oz. On removing the kidneys, a large tumour was seen extending from the tenth dorsal to the third lumbar vertebra; this tumour communicated with the abdominal aorta, by a large opening opposite the first lumbar vertebra: the tumour contained both fluid and coagulated blood, it also contained several layers of organized lymph. The bones of the

first, second, and third lumbar vertebræ were nearly entirely corroded, and the head of the last false rib on the right side was nearly destroyed; the intervertebral substance remaining unchanged. The bladder was healthy. On opening the thorax, the pericardium was found to contain a small quantity of amber-coloured fluid; the heart was large and flabby; its walls abnormally thin; its external and anterior surface showed a thick white elevated spot the size of a rupee; the valves were healthy. The right lung was healthy and free, the left lung was firmly adherent by several bands to the costal pleura.

No. 3. *Aneurism of the arch of the aorta.*

Private J. C., aged 32, a well formed man, of temperate habits; 9 years in India; admitted 26th May 1859. He stated that during the previous year he had two or three severe attacks of cough. Ten days before, whilst on board the steamer "Berenice," he had a return of the cough with loss of voice. On admission he had cough (stridulous), accelerated respiration, and a feeble voice. Pulse 70, of moderate volume. Bronchial râles were heard at the upper part of both sides of the chest. Two days after his admission, he had a severe paroxysm of stridulous cough, with difficulty of breathing, and a sense of suffocation at the end of each expiration. By the use of expectorants and opiates, with turpentine stupes to the chest, he was much relieved, and continued better until the 15th June, when, at midnight, he was suddenly seized with severe dyspnœa, and a fixed pain near the lower end of the sternum. On the following day, he was again better, and continued so until the 22nd June, when he began to suffer much from pain and distension of the epigastrium. This continued more or less till the 27th, when he had a return of the pain at the lower end of the sternum. At this time there was neither cough nor dyspnœa, but the voice was very weak; the appetite was good, and the pulse 70. Respiratory murmur is said to have been heard in both sides of the chest; rough and mixed with occasional mucous râles. On the 20th July, there having been several fits of stridulous coughing on the preceding days, it was noticed that the respiratory murmur was very feeble on the right dorsal region as compared with the opposite side, and the respirations were frequent. On the 29th he was better than he had been for some time, but whilst at tea in the evening, when eating some dry bread, he was seized with extreme dyspnœa, became blue in the face, and unable to speak. Soon afterwards, the face assumed a death-like paleness, and the eyes were fixed and staring. Each respiration was attended with a short noise as if the chink of the glottis

was nearly closed. The trachea was opened, and a tube introduced though which he breathed freely. But he was too much exhausted, and in fact almost moribund. Afterwards, some blood got into the trachea, from which, and the loss of blood externally (he appears to have lost about 10 or 12 ozs. altogether), he ceased to breathe, and, about 10 minutes after the operation, died. Artificial respiration was kept up for a short time without any effect.

*Post-mortem examination* 13 *hours after death.*—Glottis and epiglottis pale and both smooth and thickened, but not at all sufficiently so to account for death. The heart healthy in every part; on tracing the aorta an aneurismal tumour was found occupying the posterior part of the arch. It was about the size of a large orange, and half filled up with layers of fibrine and coagulated blood. The bodies of the second, third, and part of the fourth dorsal vertebræ were much covered by the lower part of the sac of the tumour, which was firmly adherent to the bone; the intervertebral substances were only a little rounded. The rest of the organs were not examined. The situation of the tumour sufficiently accounted for every symptom, though the entire absence of any bellows sound had thrown very much doubt on the diagnosis. Placed almost on the bifurcation of the trachea, its greatest pressure must have been exerted on the left recurrent nerve, and caused the stridulous noise of the cough; the œsophagus lying to the left of the tumour did not seem to have been much compressed, nor did it show any sign of ulceration.

No. 4. *Aneurism of the thoracic aorta.*

Private J. B., age 33; in India 12 years; admitted 3rd June 1859. Complained of pain over the region of the liver, with tenderness on pressure; he also had pain of the left side, extending towards the small of the back; bowels regular; tongue clean; pulse slightly accelerated; gums were spongy, and bled on pressure; appetite was good. He stated that during the preceding year he had suffered from repeated attacks of pain about the small of the back, for which he had been leeched, cupped, and blistered. Three days after his admission the pain entirely subsided, but he was attacked with fever, which was checked by small doses of quinine. On the 15th July he complained, for the first time, of short dry cough. On the 22nd, the cough continued, and he complained of pain in the left lumbar region. The chest was examined on this day, but nothing abnormal detected; the appetite continued good. Up to the 2nd August he continued to improve in his general health, but the pain in the left lumbar

region was unabated. On that day, for the first time, he spat up a small quantity of dark coloured blood. The chest was again examined, but without detecting anything abnormal. The hæmoptysis did not return ; but on the following day he complained of pain running along both sides of the neck, and extending from the shoulders to the *mastoid process*. On the evening of the 4th August he suddenly died.

*Post-mortem examination 12 hours after death.*—Body rather thin and pale ; superficial veins empty, presenting the appearance of grooved lines about the head and neck ; there were several cicatrices of healed scorbutic sores on the wrists and legs.

On opening the thorax, a quantity of serum was seen covering both lungs ; the right lung, displaced, covering the pericardium ; this displacement was caused by a solid clot of coagulated red blood weighing 4½ lbs., which was moulded into the right pleural cavity. On removing the clot, a communication was found with a tumour the size of an orange formed from the thoracic portion of the aorta corresponding with the 5th, 6th, 7th, and 8th dorsal vertebræ, whose bodies were much corroded ; the lower lobe of the left lung was gorged with blood as were the middle and lower lobes of the right lung. The pericardium was thickened, and the anterior surface of the heart showed three or four spots of organized lymph ; the heart was small and pale, its valves healthy ; the stomach healthy, and contained a pint of fluid ; the liver large, pale, and mottled, having on its anterior surface four small cartilaginous globule-shaped spots, the size of small shot ; gall bladder empty ; spleen healthy ; intestines healthy ; left kidney small and pale ; right kidney healthy.

No. 5. *Aneurism of the arch of the aorta communicating with the vena cava.*

Private M. S., age 36 years ; resident in India 14 years ; admitted 4th June 1859. A man of temperate habits, but was constantly in low spirits ; he suffered since the regiment had been at Aden from severe occasional attacks of cardiac pains, and the veins of the lower extremities became varicose. His health was so deteriorated that he was sent to Bombay with the unfits of 1856, but was returned for further treatment, and has since been frequently in hospital. He now complains of severe pain in the chest, extending from before posteriorly and affecting the spine. On auscultation a thrilling bruit is heard, particularly over the base of heart ; the sound can also be faintly heard above the right clavicle ; the pulsation of the right radial artery is different in volume from that of the left, the pulse being about 80. Thorax sounds

normal on percussion; there is slight dyspnœa which increases at night; has slept badly for some months, frequently starting in his sleep. Complains of pain shooting down the left arm in the course of the ulnar nerve,—countenance puffed, and anxious,—tongue clean,—appetite slightly impaired,—bowels act regularly. Ordered six minims of tincture of digitalis in 1 oz. of camphor mixture three times a day:—one minim of tincture of digitalis to be daily added to each dose for four days.

8*th*.—Complains of increased pain between the shoulders, particularly during the night: continue tincture of digitalis, ten minims, three times a day; half a drachm of liquor morphiæ muriatis at bed time.

13*th*.—Has experienced some relief from the pain at night since he has taken the morphia; appetite bad,—digestion painful,—countenance anxious,—pulse 90, small, and easily compressible: omit the tincture of digitalis; increase the solution of morphia to one drachm at bed time.

20*th*.—Pain has increased between the shoulders; pulse 80, thrilling; heart's sounds obscured by a bruit which extends up the vessels of the neck. He appears weak. ℞ ammoniæ carb. gr. v., tinct. opii ♏ x., mist. camph. ℥i, three times a day.

27*th*.—Still continues to complain of intense pain between the shoulders.

*July* 3*rd*.—Difficulty of breathing increased, voice becoming feeble; complains much of the usual pain between the shoulders;—to be cupped between the shoulders.

8*th*.—Breathing daily becoming more difficult,—bruit very loud,—countenance anxious,—pulse 80, thrilling, feels weak:—4 oz. of wine daily.

20*th*.—Complains of a short hacking cough since yesterday, the other symptoms same as last report:—cough mixture ordered, and beer instead of wine.

23*rd*.—Cough still continues very troublesome, each fit bringing on intense pain between the shoulders; difficulty of breathing increased; bruit very loud, extending along the arteries of the neck:—apply six leeches between the shoulders.

29*th*.—Was taken very ill at 4 P.M. with urgent dyspnœa and impending suffocation; pulse 80, fluttering; surface nearly blue; sits nearly upright in bed supported by pillows:—æther, hydrocyanic acid, and camphor mixture given.

30*th*.—Feels better, but complains of intense pain between the shoulders, and urgently requests the application of leeches. A purgative enema to be given, and apply ten leeches between the shoulders.

31*st*.—Pain much relieved by leeches; bowels acted on; pulse 80. Had, in the evening, a return of severe dyspnœa,—countenance blue,—pulse 80, fluttering,—gasping for breath,—the draughts with æther and hydrocyanic acid were repeated. He was slightly better on the morning of the 1st August, but the dyspnœa continued to recur in paroxysms, and he died at noon on the 2nd August.

*Post-mortem examination* 4½ *hours after death.*—Rigor mortis well marked; surface congested; the face, neck, and shoulders dark coloured. On opening the thorax, the pericardium was seen distended with amber coloured fluid. The heart enormously enlarged, and its cavities filled with fluid and coagulated blood; the walls of both ventricles hypertrophied, the valves healthy. The arch of the aorta gave origin to two tumours, one corresponding with the ascending portion of the aorta, about the size of an egg and pyriform, arose from the anterior portion of the ascending aorta; the second, the shape and size of an orange, arose from the posterior part of the transverse arch of the aorta eroding three of the subjacent vertebræ and communicating with the vena cava (to which it firmly adhered) by a ragged orifice the size of a swan's quill.

The liver was large, congested, and showed the signs of an old cicatrix; the large intestines healthy, but distended and inflated with gas; the bladder not empty; kidneys healthy; spleen enlarged.

No. 6. *Aneurism; Rupture of the left pulmonary Artery.*

M. B., Private, No. 6 Company; temperate habits; age 34 years; good general constitution; 13 years and 6 months in India; admitted 18th November 1859. He complained of cough, coming on in severe paroxysms, and attended with frothy mucous expectoration. There was no fever, surface was moist and cool, and the pulse 70. There was no dulness in any part of the chest, and the respiratory murmur was heard mixed with slight mucous râles. The heart's sounds were normal. From the time of his admission until the 30th November there was little change. He had frequent violent fits of coughing, and he occasionally complained of tightness across the chest. Nothing abnormal appears to have been detected in the chest by auscultation or percussion. On the evening of this day (30th November), at 9 A.M., when seated at the breakfast table, he was suddenly seized with faintness, and almost immediately expired.

*Post-mortem examination* 5 *hours after death by Staff Assistant Surgeon Mackay.*—On opening the thorax, the lungs, heart, and pleuræ appeared in the normal position. On opening the pericardium (which

before incision appeared very tense), about 6 oz. of serum escaped, and on closer examination the heart was found encased in a bloody clot, which on being removed weighed 12 oz. The auricles and ventricles of the heart were healthy, but on making an incision along the course of the aorta it was found covered throughout its entire course with a fatty deposit. On examining the left pulmonary artery a small transverse rent to the extent of ¼ of an inch was discovered, which rent was filled with a clot. There were no signs of ulceration on the external surface of the artery, but on its internal surface the rent was surrounded with a chronic ulcer about the size of a shilling.

Brain, lungs, liver, and intestines healthy.

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## No. 10.

### *Note on the Medical History of the Troops on board Ship from England to Bombay and Kurrachee, which arrived during the months of November and December* 1857, *and January and February* 1858.*

Presented by the Secretary, March 1858.

At first sight it might appear a simple matter to collate the results of a number of Journals, kept in a particular form, of the voyages of ships bringing troops to India. But it is otherwise. Out of twenty-four or twenty-five Journals which were examined, it was found that no two medical officers recorded their observations alike, and although want of uniformity in this respect affords trouble to the statistical gleaner, it permits each medical officer to make his remarks freely, and to dwell particularly upon circumstances as they occur. But it not unfrequently happened that even this latitude was in very many instances overstepped, especially in the nomenclature of disease; fanciful, antiquated, or obsolete names being employed, and sometimes so great a licence indulged in, as to record a disease by one of its most prominent symptoms, as, for example, "*fainting*" for disease of the heart.

The observations about to be made will be confined to an examination of the Journals of twenty-four ships which conveyed troops from England to Bombay, and Kurrachee. Many other vessels arrived, but their Journals were not forthcoming; whilst with troops from the Mauritius, the Cape of Good Hope, and by the Overland route, no Journals were kept, or at least delivered in.

* This paper was kept back from publication in the last volume of the Transactions for want of room.

The troops were either recruits for regiments already in the Bombay Presidency, or the North-West Provinces, or they belonged to regiments sent to India. Four regiments of cavalry and twelve of infantry arrived by these ships, and the total number is seen in the following Table.

| | Rank and File. | Officers. | Women. | Children. |
|---|---|---|---|---|
| New Regiments for Bombay ..... | 8,744 | 383 | 118 | 138 |
| Regiments for the Punjaub..... | 2,120 | 92 | 83 | 76 |
| Recruits of H. M.'s Service..... | 499 | 12 | .. | .. |
| Recruits of E. I. C. Service..... | 556 | 3 | 15 | 6 |
| Recruits of H.M's Service in the Punjaub. | 947 | 19 | 98 | 95 |
| Total.. | 12,866 | 509 | 314 | 315 |

But from the Journals of the twenty-four ships before mentioned, the total strength of troops is only 9,366, viz : 8,653 men, 203 women, 184 children, and 325 officers.

The total tonnage of the ships was 28,423 tons, and the freight Rs. 2,56,556, being an average per head of £28 11*s.* 10*d.* But the tonnage of 5 ships not included was 7,401 tons, and the freight Rs. 88,344, at the average rate of £41 10*s.* 8*d.*, which, if taken into account, raises the average freight per head to £31 3*s.* 5*d.* From the Mauritius and the Cape of Good Hope the average freight was about £8 4*s.* 2*d.* per head. The smallest sized vessel from England was of 714 tons, and the largest of 3,209 tons ("The Great Britain"). The lowest rate of freight was £11 10*s.* 6*d.* and the highest £49 per head. The ships that left in July had an average freight of £13 7*s.* 5*d.*, in August £20, in September £28 7*s.*, in October £49, and in November £45. The medicines put on board for the use of the troops varied in value from £25 to £80 according to the number of men embarked. The average cost appears to have been nearly £38 per ship.

Out of the total strength of 9,366 troops embarked, there were 2,190 cases of sickness; of these, 2,019 recovered, 8 died, 5 were found dead or drowned, and 163 arrived sick; or a per-centage of about 23·5 of sick to strength, and of about 0·1 of deaths to strength. There were 23 births from amongst 203 women, in the proportion of births to strength of about 10 per cent.

The admissions from disease during the voyage were 2,190, out of which class XI,* "venereal affections" numbered 687, or 31·5 per

* Se Tables at the end.

cent.; then class IX, "abscesses and ulcers," 331, or 15 per cent. The anomalous class XVI, "other diseases," ranks next at 250, or 11·5 per cent.; then the class of "wounds and injuries," 219, or 10 per cent.; "diseases of the stomach and bowels," 188, or 8·5 per cent.; "diseases of the lungs," 171, or 7·8 per cent. There were only 85 cases of fever, 79 of rheumatism, 78 of diseases of the eyes, 47 of diseases of the skin, 27 of diseases of the brain, 16 of diseases of the liver, 8 instances of punishment, 2 cases of supposed cholera, 1 of dropsy, and 1 of eruptive fever (small pox).

*Venereal affections.*—Of the largest class, No. XI., "venereal affections," out of 687 admissions, 653 were discharged cured, and only 34 remained. There were 201 cases of primary syphilis, and all, except five, recovered. It is impossible to imagine how, during a voyage of many weeks, all *primary* syphilis cases were not discharged cured, or that any should remain. The primary symptoms were very various. It is singular, however, that on board one ship (the "Calcutta"), with 803 men, no case is recorded; whilst in another (the "Princess Charlotte"), with 703 men, 41 cases were observed. In the former vessel only 2 cases of gonorrhœa, in the latter 11 were treated. Among 376 recruits on board the "Gosforth" also, there was no case of either primary or of secondary syphilis seen, and only 4 of gonorrhœa; whilst in the "Vernon," with 204 recruits, there were 10 cases of primary syphilis, and 12 of gonorrhœa. On board the "Sedgmoor" there were no cases of primary syphilis, but 26 of ulcus-non-syphiliticus, and 18 of gonorrhœa. The same observation relates also to the "Prince Albert;"—no primary syphilis, but 30 of ulcus-non-syphiliticus, and 17 gonorrhœa. In one ship, "the Atheletæ," out of 191 men there were 3 cases of simple bubo, and 2 of orchitis; no primary syphilis, no gonorrhœa. It is remarkable that venereal affections chiefly abounded in ships in which married men with their wives were on board; thus, with reference to the Tables at the end,

| Ships. | Men. | Women. | Syphilis. | | Gonorrhœa. |
|---|---|---|---|---|---|
| | | | Primary. | Secondary. | |
| Seringapatam | 213 | 24 | 8 | 0 | 12 |
| Ramilies | 212 | 13 | 10 | 6 | 16 |
| Owen Glendower | 270 | 28 | 20 | 7 | 25 |
| Bombay | 348 | 36 | 9 | 2 | 14 |
| Castle Eden | 232 | 14 | 19 | 0 | 12 |
| Albuera | 227 | 18 | 8 | 0 | 9 |

On board the "Castle Eden," 1 primary syphilis admitted on the 18th July remained still uncured on the 12th December. Another admitted on the 20th July in the "Owen Glendower," was not discharged on the 24th December. In the "Great Britain," 19 admitted in November, and not discharged at the end of December. In the "Prince Albert," 2 admitted on the 16th and 29th November, were not cured at the end of December. There were 5 cases of "leucorrhœa" amongst females, and 27 of purulent discharge from the vagina amongst children. Under class XI. there were 35 cases of "orchitis," of which 30 were cured, and 5 remained. The mercurial and non-mercurial treatment of primary syphilis had each its supporters, and as far as a careful examination of the records extends, the greater number of medical officers were in favour of the non-mercurial plan. It may be observed, in passing, that venereal cases amongst soldiers, if not voluntarily disclosed, are easily found out by careful health inspections. On board some of the ships, these inspections were conducted with great care, and disease discovered. A number of cases were recorded where men at sea were found with excoriations, and sores half covered with offensive secretions, which they were too lazy to wash off, and which required merely cleanliness to remove. The treatment of syphilis by mercury at sea, especially in the English Channel in winter, appears not at all desirable; but in the summer months it may be undertaken with advantage. If mercury is not given at the early part of a voyage, it is doubtful if it should be administered afterwards, when there is always some tendency to scurvy. The favourite treatment for secondary syphilis was iodide of potassium; very few cases happened in which mercury was given. The form in which the disease chiefly showed itself was a skin affection,—only in one or two cases were the fauces ulcerated. There was no other form seen, nor any advanced stage observed. Undoubtedly, however, much of the rheumatism that prevailed may have been due to this cause. There were 60 cases of "*Secondary Syphilis*," 50 of which were cured, and 10 remained. There was no case amongst the recruits, and none in 7 out of 24 ships; whilst of primary syphilis also there were 6 ships in which the disease was not mentioned as having occurred; but of gonorrhœa only 3 ships were exempt. There were 200 admissions from gonorrhœa, and only 1 case remaining, and 199 cured; of simple bubo 110 cases, and 100 cured; of ulcus non-syphiliticus 79 cases, and 77 cures; orchitis 19 cases, and 16 cures; whilst stricture of the urethra 4, all cured.*

* All medical officers complain of the insufficiency of medicines put on board for these complaints.

*Abscesses and Ulcers.*—Were chiefly phlegmons, and slight cases; they were 234 in number. Paronychia was not uncommon, 13 cases being recorded. There were 83 cases of ulcers, 74 of which were cured.

*Other Diseases.*—Amongst the class "*other diseases*" the largest number were from *Cynanche Tonsillaris*, 51 cases (18 in the "Prince Albert," 5 in the "Forerunner," 4 in the "Seringapatam," 6 in the "Owen Glendower," 7 in the "Bombay," and 11 in the other remaining ships), all recovered. Next in point of numbers was *Debility*, 25. The most important disease, perhaps, was *Scurvy*, of which there were 19 instances (1 "Owen Glendower," 1 "Gosforth," 6 "Bombay," 8 "Albuera," and 3 "Castle Eden,"), all, except one, recovered. There was 1 case of *Hernia* in the "Waterloo," which, as a surgical disease affecting a soldier, is important. *Otitis*, and various diseases of the Ear, were not unfrequent. There were 7 cases of *Erysipelas*, and 5 cases of *Carditis*.

*Wounds and Injuries.*—The class of "*Wounds and Injuries*" calls for no remarks. Contusions, sprains, slight wounds, bruises, and scalding, were the chief forms. There were, however, 12 cases of fracture, of which 9 recovered; and 5 cases of dislocation. No voyage seems to be made without accidents of this sort happening, and the state of the weather may, perhaps, have some influence. Fractures of the clavicle, and dislocation of the shoulder joint, were the common forms.

*Diseases of the Stomach and Bowels.*—Were of an ephemeral kind, and 179 cases out of 188 were cured, 9 remain, and no deaths. Diarrhœa, dyspepsia, and colic were the chief forms. There were 18 cases of *acute* Dysentery, but none of *chronic* (the formidable complaint of the European soldier long in India). Constipation was very common, and it is a prominent feature in all illness at sea, preceding almost all serious ailments, especially amongst women; change of diet, and other influences often bring on obstinate and long continued constipation. Sea attacks of sickness are very frequently recorded; they begin at the outset of the voyage, and depend much on the state of the weather. Sea sickness acts injuriously on the sick, or convalescent; it aggravates their ailments, the stomach rejects all food, the system becomes lowered, morbid action supervenes, and a feverish state follows. Females seem to suffer more than males. The remedies for sea sickness recorded in these journals are very numerous.

*Acute Dysentery.*—Was not seen at the beginning of the voyage, but said to arise from improper food, neglected constipation, exposure, &c.; there can be no doubt, that whatever tends to the development of

scurvy, is also favourable to bring on dysentery. In the treatment of dysentery on board ship, astringents and opiates appear to have been most used; in some, quinine was given, but the dysentery at sea is not so much malarious as scorbutic. *Diarrhœa* was very prevalent, especially amongst children. It arises often from improper food, but is not so common in voyages now as heretofore, as better provisions for children are allowed.

*Diseases of the Lungs*—are interesting, as amongst them, we find the first death recorded. Out of 15 cases of acute bronchitis, 2 terminated fatally, one in a child, admitted 28th June and died 19th July. There was no chronic bronchitis, but acute catarrh was the prevailing complaint,—143 cases, of which 133 recovered. Only 3 cases of *Pneumonia* are mentioned, 2 cured and 1 remained. There were three cases of *Phthisis*, 2 brought on to India, and 1 left at the Mauritius.

The class of *Fevers* is particularly interesting. There was only *one* case of intermittent fever recorded, and its type was not defined. It was said to have occurred in an old soldier, who had been in the East Indies before; it was cured by quinine. There were 76 cases of common continued fever, 3 deaths therefrom; 1 case of typhus, which terminated fatally; and one case of small pox, which recovered. Of remittent fever, there were 4 cases.

*Diseases of the Eyes.*—Out of a total of 78 cases, all, except 7, recovered; 73 out of the 78 were instances of common simple conjunctivitis. There was only one case of *Nyctalopia*, which is rather remarkable out of voyages of many weeks and amongst nearly 10,000 troops. This affection has been considered a species of sun-stroke of the retina. It is popularly attributed to the effect of moonlight, and occurs, it is said, most frequently at full moon. Heat, accompanied with glare on the water, intensified by reflection from the water, probably produces this as well as nearly all other affections of the eyes at sea.

*Rheumatic Affections.*—There were 79 cases recorded, of which 54 were acute, and only 17 chronic rheumatism. There were also 5 cases of *Arthritis*. The treatment of acute rheumatism was very various. Some medical officers depended almost entirely on lime-juice, considering that the disease had a scorbutic origin, which is not unlikely. In one ship, the "Gosforth," the potash treatment was steadily adopted, and with success.

*Diseases of the Skin.*—There were 47 examples, embracing one or two instances of nearly every form of skin disease. The most common were *Urticaria, Ecthyma, Porrigo, Scabies, Lepra, Eczema,*

*Acne, Herpes, Impetigo,* &c. There were 13 cases recorded under the general term *Morbis Cutis.*

*Diseases of the Brain.*—Of this class of disease, 12 were denominated *Cephalalgia,* and 7 cases marked *Ictus Solis.* There were 7 cases of epilepsy, and one of paralysis. In all these head affections, a cure was effected, and none remained under treatment at the end of the voyage. Coup de soleil, or sunstroke, is said not to be uncommon at sea. It is considered to occur most frequently at the after part of the day and after meals, when the ship is heated and the sun not perpendicular. In these instances, a high temperature, and the prolonged action of heat without any actual exposure to the sun's rays, are the probable exciting causes. Heat and stimulation do their work, although exercise in the sun on board ship in the colder latitudes is not uncommon.

*Diseases of the Liver.*—Of all the affections of the liver at sea, jaundice appears to be the most common;—there were 9 instances recorded, and some of an obstinate character. There were 7 cases of acute, but none of chronic hepatitis. The acute form was not severe, and yielded readily to antiphlogistic treatment.

*Cholera.*—Two cases are reported, but from the histories furnished, the cases appear scarcely to deserve the designation of cholera being applied to them.

One case of anasarca, and one case of small pox, complete an enumeration of all that is interesting in the medical history of the troops.

*Fatal Cases.*—The total number was 13; but of these, 3 men were drowned overboard, and 2 men were found dead in their beds. The remaining deaths which occurred under treatment were, 4 from fever, —of the common continued or typhoid form; 2 from bronchitis; 1 from asphyxia, and 1 from carditis.

*Surgical Cases.*—12 instances of fracture, 11 simple and 1 compound; of which 5 were of the clavicle; 4 of the bones of the leg, one of which was a compound fracture of both bones of the leg, and protrusion of the upper part of the tibia; 2 cases of fractured ribs, and 1 of fracture of the humerus. There were 5 instances of dislocation, 3 of the humerus forwards, 1 of the right ulna backwards, and the other was a sprained wrist.

*Medical Comforts.*—In every ship medical comforts were reported to be sufficient. Of the more important, the quantities were as follows: chloride of lime 100 lbs. to each ship; and for each individual embarked, sago 4 oz.; rice 1 lb.; sugar 2 lbs.; preserved milk 2 tins; soup and bouilli 1 lb.; soap 2 lbs. Limejuice, being considered to be part of the rations, only a small quantity was allowed.

*Return of Sick of European Troops on*

STRENGTH.—Officers 324; Men 8,651;

| DISEASES. | | Admtd. | Dischd. | Died. | Remng. |
|---|---|---|---|---|---|
| Fevers — No. I. | Febris Ephemera | 3 | 3 | .. | .. |
| | ,, Intermittens | 1 | 1 | .. | .. |
| | ,, Remittens | 4 | 3 | .. | 1 |
| | ,, Continua Communis | 76 | 65 | 3 | 8 |
| | ,, Typhus | 1 | .. | 1 | .. |
| No. II. Eruptive | Variola | 1 | .. | .. | 1 |
| | Erysipelas | 7 | 4 | .. | 3 |
| Diseases of — No. III. Lungs, &c. | Pleuritis | 5 | 5 | .. | .. |
| | Pneumonia | 3 | 2 | .. | 1 |
| | Hæmoptysis | 1 | 1 | .. | .. |
| | Catarrhus Acutus | 143 | 133 | .. | 10 |
| | Phthisis Pulmonalis | 3 | 1 | .. | 2 |
| | Bronchitis | 15 | 11 | 2 | 2 |
| | Dyspnœa continua | 1 | 1 | .. | .. |
| No. IV. Heart | Carditis | 5 | 3 | 1 | 1 |
| No. V. Liver and Spleen | Hepatitis Acuta | 7 | 7 | .. | .. |
| | Icterus | 9 | 7 | .. | 2 |
| No. VI. Stomach and Bowels | Dyspepsia | 33 | 29 | .. | 4 |
| | Gastritis | 2 | 2 | .. | .. |
| | Enteritis | 2 | 2 | .. | .. |
| | Dysenteria Acuta | 18 | 16 | .. | 2 |
| | Diarrhœa | 97 | 94 | .. | 3 |
| | Colica | 21 | 21 | .. | .. |
| | Cholera Epidemica | 2 | 2 | .. | .. |
| | Obstipatio | 15 | 15 | .. | .. |
| | Hæmorrhois | 11 | 10 | .. | 1 |
| | Fistula in Ano | 1 | .. | .. | 1 |
| No. VII. Brain | Cephalalgia | 12 | 12 | .. | .. |
| | Ictus Solis | 7 | 7 | .. | .. |
| | Paralysis | 1 | 1 | .. | .. |
| | Epilepsia | 7 | 7 | .. | .. |
| No. VIII. Rheumatic affections | Rheumatismus Acutus | 54 | 46 | .. | 8 |
| | ,, Chronicus | 17 | 15 | .. | 2 |
| | Lumbago | 1 | 1 | .. | .. |
| | Podagra | 1 | 1 | .. | .. |
| | Odontalgia | 1 | 1 | .. | .. |
| | Arthritis | 5 | 3 | .. | 2 |
| No. IX. Phlegmons and Ulcers | Phlegmon et Abscessus | 234 | 219 | .. | 15 |
| | Paronychia | 13 | 12 | .. | 1 |
| | Ulcus | 83 | 74 | .. | 9 |
| No. X. Wounds and Injuries | Luxatio | 5 | 5 | .. | .. |
| | Subluxatio | 19 | 19 | .. | .. |
| | Vulnus | 52 | 50 | .. | 2 |
| | Contusio | 97 | 83 | .. | 14 |
| | Fractura | 12 | 9 | .. | 3 |
| | Ambustio | 30 | 28 | .. | 2 |
| | Concussio Cerebri | 4 | 4 | .. | .. |
| No. XI. Venereal Diseases. | Syphilis primitiva | 201 | 196 | .. | 5 |
| | ,, consecutiva | 60 | 50 | .. | 10 |
| | Ulcus Penis, Non-Syphiliticus | 79 | 77 | .. | 2 |
| | Gonorrhœa | 200 | 199 | .. | 1 |
| | Hernia Humoralis | 1 | 1 | .. | .. |
| | Bubo | 110 | 100 | .. | 10 |

*board of 24 Ships from England.*

Women 196; Children 177; Total 9,348.

| Diseases. | | Admtd. | Dischd. | Died. | Remng. |
|---|---|---|---|---|---|
| No. XII. Diseases of the Genito-urinary organs | Orchitis | 35 | 30 | .. | 5 |
| | Phymosis | 7 | 4 | .. | 3 |
| | Purulent discharge of Vagina | 2 | 2 | .. | .. |
| | Strictura Urethræ | 4 | 4 | .. | .. |
| | Leucorrhœa | 5 | 5 | .. | .. |
| Diseases of — No. XIII. The Eye | Ophthalmia | 73 | 66 | .. | 7 |
| | Iritis | 4 | 4 | .. | .. |
| | Nyctalopia | 1 | 1 | .. | .. |
| No. XIV. The Skin | Urticaria | 8 | 8 | .. | .. |
| | Ecthyma | 1 | 1 | .. | .. |
| | Porrigo | 3 | 3 | .. | .. |
| | Scabies | 8 | 8 | .. | .. |
| | Lepra | 2 | 1 | .. | 1 |
| | Eczema | 2 | 1 | .. | 1 |
| | Morbus Cutis | 13 | 12 | .. | 1 |
| | Acne | 3 | 2 | .. | 1 |
| | Herpes | 5 | 5 | .. | .. |
| | Impetigo | 2 | 2 | .. | .. |
| No. XV. | Punitus | 8 | 8 | .. | .. |
| No. XVI. Other Diseases | Anasarca | 1 | .. | .. | 1 |
| | Abortio | 1 | 1 | .. | .. |
| | Aphthæ | 1 | 1 | .. | .. |
| | Asphyxia | 1 | .. | 1 | .. |
| | Condylomata | 6 | 6 | .. | .. |
| | Cynanche Tonsillaris | 51 | 51 | .. | .. |
| | Dysecœa | 1 | 1 | .. | .. |
| | Dysuria | 3 | 3 | .. | .. |
| | Debilitas | 25 | 24 | .. | 1 |
| | Epistaxis | 1 | 1 | .. | .. |
| | Feigned disease | 1 | 1 | .. | .. |
| | Hæmorrhagia | 1 | 1 | .. | .. |
| | Hysteria | 3 | 3 | .. | .. |
| | Ischuria | 1 | 1 | .. | .. |
| | Laryngitis | 1 | 1 | .. | .. |
| | Labor | 15 | 15 | .. | .. |
| | Menorrhagia | 7 | 7 | .. | .. |
| | Mumps | 1 | 1 | .. | .. |
| | Nephritis | 6 | 6 | .. | .. |
| | Otitis | 17 | 15 | .. | 2 |
| | Observatio | 12 | 10 | .. | 2 |
| | Prolapsus Ani | 1 | 1 | .. | .. |
| | Palpitatio | 3 | 3 | .. | .. |
| | Periostitis | 1 | 1 | .. | .. |
| | Scorbutus | 19 | 18 | .. | 1 |
| | Scrofula | 5 | 2 | .. | 3 |
| | Spasm | 1 | 1 | .. | .. |
| | Sea Sickness | 8 | 8 | .. | .. |
| | Tumores | 13 | 8 | .. | 5 |
| | Varix | 1 | 1 | .. | .. |
| | Vermes | 3 | 2 | .. | 1 |
| | Total | 2,190 | 2,019 | 8 | 163 |

*List of Twenty-four Ships, which arrived from England with Troops*

| Destination. | Ship's Name. | Place from whence sailed. | Dates of Departure. | Dates of Arrival. | Tonnage. | Rate of Freight per ton. £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| Kurrachee . | Roman Emperor .. | Gravesend . | July 1857 .. | Nov. 1857. | 793 | 14 | 12 | 6 |
| Ditto .. | Albuera ..... | do. .. | do. .. | do. .. | 887 | 12 | 5 | 6 |
| Ditto .. | Sir Geo. Seymour .. | do. .. | 14th do. .. | 17th Dec.. | 850 | 12 | 18 | 8 |
| Ditto .. | Castle Eden ..... | do. .. | 18th do. .. | 12th do... | 930 | 15 | 18 | 4 |
| Ditto .. | Bombay ..... | do. .. | do. .. | Nov... | 1279 | 11 | 10 | 6 |
| Ditto .. | Owen Glendower.... | do. .. | 20th do. .. | 24th do. .. | 989 | 13 | 12 | 6 |
| Ditto .. | Ramillies..... | do. .. | do. .. | do. .. | 740 | 13 | 2 | 6 |
| Ditto .. | Seringapatam ..... | do. .. | do. .. | do. .. | 870 | 12 | 19 | 0 |
| Ditto .. | Ireland..... | Portsmouth | Sept. do. .. | Dec. .. | 1150 | 43 | 0 | 0 |
| Ditto .. | Athletæ ..... | Cork .... | do. .. | do. .. | 1056 | 18 | 9 | 0 |
| Bombay .. | Southampton ..... | do. .... | Aug. do. .. | do. .. | 971 | 19 | 15 | 0 |
| Ditto .. | Prince Albert ..... | Gravesend . | do. .. | do. .. | 2000 | 44 | 18 | 9 |
| Ditto .. | Vernon ..... | do. .. | do. .. | do. .. | 955 | 14 | 19 | 0 |
| Ditto .. | Genghis Khan .... | do. .. | do. .. | Nov... | 1306 | 18 | 19 | 0 |
| Ditto .. | Sedgemoor ..... | do. .. | 28th do. .. | Dec. .. | 965 | 19 | 8 | 0 |
| Ditto .. | Warrior Queen .... | do. .. | do. .. | do. .. | 988 | 17 | 17 | 7 |
| Ditto .. | Forerunner ..... | do. .. | do. .. | do. .. | 558 | 17 | 10 | 0 |
| Ditto .. | Matilda Atheling .. | Portsmouth | do. .. | do. .. | 714 | 16 | 8 | 10 |
| Ditto .. | Waterloo ..... | Cork .... | do. .. | Jan. 1858. | 898 | 18 | 19 | 6 |
| Ditto .. | Gosforth ..... | Gravesend . | Sept. do. .. | Dec. 1857. | 810 | 13 | 19 | 6 |
| Ditto .. | Scotia ..... | Portsmouth | do. .. | do. .. | 1020 | 38 | 0 | 0 |
| Ditto .. | Great Britain ..... | Cork .... | Oct. do. .. | do. .. | 3209 | 49 | 0 | 0 |
| Ditto .. | Calcutta ..... | do. .... | do. .. | do. .. | 2245 | 49 | 0 | 0 |
| Ditto .. | Princess Charlotte .. | do. .... | do. .. | Feb. 1858. | 2200 | 45 | 0 | 0 |

*in November and December* 1857,—*January and February* 1858.

| Troops. | Number. | | | | | Number of Sick. | Recovered. | Died. | Remaining. | Medical Officer in charge. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Officers. | Men. | Women. | Children. | Total. | | | | | |
| H.M.'s 61st Regt. | 1 | 90 | 9 | 5 | 251 | 85 | 83 | 2 | .. | Dr. J. T. Mackenzie. |
| ,, 87th do. | 2 | 103 | 21 | 20 | | | | | | |
| ,, 27th do. | 3 | 35 | 3 | 4 | 264 | 91 | 89 | .. | 2 | Asst. Sur. H. H. Jones, 87th Regt. |
| ,, 81st do. | 2 | 192 | 15 | 10 | | | | | | |
| ,, 7th R. Fus. | 9 | 227 | 18 | 18 | 272 | 76 | 75 | .. | 1 | ,, T. E. Hale, 7th Fuslrs. |
| ,, 7th do. | 1 | 57 | .. | .. | 272 | 76 | 75 | .. | 1 | Surgeon H. C. Boate. |
| ,, 52nd L. Inf. | 3 | 177 | 14 | 20 | | | | | | |
| ,, 24th Regt. | 4 | 75 | 3 | 1 | | | | | | |
| ,, 61st do. | .. | .. | 1 | 3 | 427 | 326 | 320 | .. | 6 | ,, W. Whittall, Bengal Est. |
| ,, 70th do. | 3 | 273 | 32 | 32 | | | | | | |
| ,, 7th R. Fus. | 14 | 240 | 28 | 16 | 328 | 169 | 151 | 1 | 17 | ,, T. Moorhead, 7th Fuslrs. |
| ,, 7th do. | 11 | 212 | 13 | 18 | 254 | 147 | 133 | .. | 14 | Asst. Sur. C. Rickett, 7th do. |
| ,, 7th do. | 4 | 213 | 24 | 24 | 265 | 90 | 82 | .. | 8 | ,, T. Stanley, 7th do. |
| ,, 98th Regt. | 19 | 301 | .. | .. | 320 | 31 | 31 | .. | .. | ,, J. M. Beatty, 98th Regt. |
| ,, Royal Arty. | 6 | 185 | .. | .. | 191 | 37 | 35 | .. | 2 | ,, F. H. Forshall, R. A. |
| ,, 56th Regt. | 14 | 354 | .. | .. | 368 | 86 | 78 | .. | 8 | ,, T. W. Knox, 56th Regt. |
| ,, R. H. Arty. | 8 | 219 | .. | .. | 500 | 118 | 104 | .. | 14 | ,, Woodward, R. H. A. |
| ,, 72nd Hlrs. | 10 | 263 | .. | .. | | | | | | |
| H. Co.'s Recruits. | .. | 204 | .. | .. | 204 | 38 | 34 | 1 | 4 | ,, J. M. Musgrave, Bombay Establishment. |
| H.M.'s 3rd D. G. | 16 | 289 | .. | .. | 417 | 58 | 49 | .. | 9 | Surgeon R. M. Allen, 3rd D. G. |
| ,, 64th Regt. | .. | 13 | .. | .. | | | | | | |
| ,, 86th do. | 1 | 98 | .. | .. | | | | | | |
| ,, 14th L. D. | 1 | 60 | .. | .. | | | | | | |
| ,, R. Artillery | 2 | .. | .. | .. | | | | | | |
| ,, 64th Regt. | 1 | 59 | .. | .. | | | | | | |
| ,, 78th Hlrs. | 4 | 98 | .. | .. | 368 | 161 | 158 | .. | 3 | Asst. Sur. E. D. Atkinson, R. A. |
| ,, 83rd Regt. | 3 | 135 | .. | .. | | | | | | |
| ,, 86th do. | 2 | .. | .. | .. | | | | | | |
| ,, 32nd do. | 1 | 2 | .. | .. | | | | | | |
| ,, Royal Arty. | 11 | 280 | .. | .. | 297 | 12 | 8 | 1 | 4 | ,, T. J. Orton, R. Artillery |
| ,, 3rd Dra. G. | 1 | 74 | .. | .. | 75 | 4 | 4 | .. | .. | ,, Stanley. |
| ,, 3rd do. | 7 | 251 | .. | .. | 258 | 102 | 101 | 1 | .. | ,, C. J. White, 3rd D. G. |
| ,, 72nd Hlrs. | 14 | 296 | .. | .. | 310 | 34 | 34 | .. | .. | ,, T. W. Rutter, 72d Hlrs. |
| ,, 56th Regt. | 15 | 300 | .. | .. | 315 | 54 | 50 | .. | 4 | Surgeon W. Deeble, 56th Regt. |
| H. Co.'s Recruits. | 3 | 352 | 15 | 6 | 376 | 33 | 32 | .. | 1 | A. Sur. W. A. Shepherd, Bom. Est. |
| H.M.'s 72nd Hlrs. | 15 | 326 | .. | .. | 341 | 69 | 65 | 1 | 3 | Surgeon W. C. Seaman, 72nd Hlrs. |
| ,, 8th Husrs. | 24 | 485 | .. | .. | | | | | | |
| ,, 14th L. Drs. | .. | 16 | .. | .. | | | | | | |
| ,, 17th Lan. | 21 | 423 | .. | .. | 1110 | 51 | 33 | 1 | 17 | ,, E. Mockler, 17th Lancers |
| ,, 33rd Regt. | .. | 7 | .. | .. | | | | | | |
| ,, 56th do. | 9 | 65 | .. | .. | | | | | | |
| ,, 51st L. Inf. | 29 | 773 | .. | .. | | | | | | |
| ,, 33rd Regt. | .. | 10 | .. | .. | 832 | 28 | 25 | .. | 3 | ,, H. M. Webb, 51st L. I. |
| ,, 86th do. | .. | 20 | .. | .. | | | | | | |
| ,, 18th R.I.R. | 28 | 648 | .. | .. | | | | | | |
| ,, 33rd Regt. | 1 | 14 | .. | .. | 733 | 212 | 170 | .. | 42 | ,, T. Crawford, 18th R. I. |
| ,, 95th do. | 1 | 41 | .. | .. | | | | | | |
| Total .. | 324 | 8651 | 196 | 177 | 9348 | 2190 | 2019 | 8 | 163 | |

# ABSTRACT PROCEEDINGS

OF THE

# MEETINGS OF THE MEDICAL AND PHYSICAL SOCIETY,

FOR THE YEAR 1859.

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## No. 1.

## ANNUAL MEETING HELD 8TH JANUARY 1859.

*Present :*

A. H. Leith, M.D. ; J. W. Winchester, LL.D. ; W. Arbuckle, M.D. ; H. J. Carter, Esq. ; W. Campbell, M.D. ; J. Peet, M.D. ; H. Giraud, M.D. ; W. C. Coles, M.D. ; and C. C. Mead, Esq.

The Secretary read the following Report :—

*Annual Report.*

The practice which for some years prevailed of reading at the Annual Meeting a short review of the year fell into disuse in 1857 and 1858, but may be now resumed.

During the past year there have been eight Ordinary Monthly Meetings held, and the attendance on each occasion must be considered to have been good, and equal at least to the average attendance of former years.

Eight new paying and seventeen new *non*-paying Members have joined the Society since the last Annual Meeting.

At the beginning of the year, and shortly after his election as President, the Society lost the valuable aid and co-operation of Dr. Morehead, and at a time when the great interest taken by him in the success of the Society would have been productive of much good. Since his

removal to Poona, however, he has indirectly contributed to the interest of the monthly meetings, and his "Memorandum on the Sanitarium at Poorundhur," presented by the Director-General Medical Department, was read at the August meeting.

The largest number of papers laid before the Society has been forwarded by the Director-General Medical Department, who, as Patron of the Society, has continued to promote its welfare. Amongst these papers the Topographical descriptions of Belgaum, Jacobabad, and Sawunt Warree, the Annual Report of the European General Hospital, &c., &c., may be mentioned.

The chief original contributors have been Messrs. Carter, Peet, Ballingall, and Haines; and the subjects investigated by them have been of various interest and importance. That of "Coup-de-soleil" by the Professor of Medicine, occupied the attention of two consecutive meetings. The Surgical cases and the observations on Elephantiasis, by the Professor of Surgery; the Medico-legal cases, by the Coroner's Surgeon; and the investigations into the habits of "the Dracunculus," "the Naïs," and Leeches, also by Dr. Carter, as well as the Chemical papers by Dr. Haines, have been listened to with much attention, and will become of great value when placed upon permanent record in the pages of the Society's Transactions. The Secretary contributed a paper on the health of the European troops lately arrived;* and Drs. Broughton and Glasse have also favoured the Society with original communications.

It has been a matter of regret to the Committee that circumstances have prevented the publication of the Transactions being commenced before now, but an endeavour will be made to ensure their appearance within the next few months. The practice of publishing a volume once in two years will, it is hoped, not be departed from; but as the last volume was brought up to the close of 1856, the volume for the years 1857 and 1858 is only just now due.

The contributions to the Library have been chiefly made by Government, by the Director-General Medical Department, and by local Societies. The special thanks of the Society are due to the Editors of the Dublin Quarterly Review, and of the Association Monthly Journal, both of which periodicals are regularly supplied.

The funds of the Society have been considerably advanced, as will be seen by the annual statements of the accounts now laid on the Table; the receipts have steadily increased, whilst the expenditure has been small. The balance, therefore, in the Bombay Bank will assist towards defraying the expense of printing a volume of the Transactions.

* Published at p. xlix *ante*.

*Annual Statement of Receipts and Disbursements of the Medical and Physical Society, from 1st January to 31st December 1858.*

| Receipts. | Amount. | | | Disbursements. | Amount. | | |
|---|---|---|---|---|---|---|---|
| | *Rs.* | *a.* | *p.* | | *Rs.* | *a.* | *p.* |
| Balance of last Account closed on the 31st December 1857 ..... | 491 | 8 | 5 | Amount paid for printing Circulars, &c..... | 53 | 0 | 0 |
| Subscriptions received from 1st January to 31st December 1858 ..... | 951 | 12 | 0 | Office Establishment and petty charges, &c..... | 137 | 8 | 0 |
| | | | | Balance in the Bombay Bank ..... | 1,252 | 12 | 5 |
| Rupees.. | 1,443 | 4 | 5 | Rupees.. | 1,443 | 4 | 5 |

The election of the Committee of Management for the year 1859 by the votes of all Members of the Society (who had recorded their votes) was declared. The following gentlemen were found to be elected :—A. H. Leith, M.D. ; J. W. Winchester, LL.D. ; W. Arbuckle, M.D. ; H. J. Carter, Esq. ; J. Peet, M.D. ; H. Giraud, M.D. ; W. C. Coles, M.D. ; and G. R. Ballingall, M.D.

The election of Office-bearers then took place, when Dr. Leith was unanimously elected President, Mr. Carter and Dr. Peet, Vice-Presidents,—Dr. Coles continuing in office as Secretary.

After the examination of the accounts of the Society, and transaction of ordinary business, the meeting adjourned.

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No. 2.

## MONTHLY MEETING HELD 5TH FEBRUARY 1859.

*Present :*

H. J. Carter, Esq., *Vice President*, in the Chair ; J. Peet, M. D., *Vice President*.

*Members.*—J. W. Winchester, LL.D. ; R. D. Peele, Esq. ; W. Campbell, M.D. ; H. Giraud, M.D. ; F. Broughton, Esq. ; J. M. Hyslop, M.D. ; C. C. Mead, Esq. ; G. R. Ballingall, M.D. ; G. C. M. Birdwood, M.D. ; H. V. Carter, M.D. ; and W. C. Coles, M.D., *Secretary*.

*Visitor.*—Dr. Gomes of Goa.

The proceedings of the last meeting were read and confirmed.

Letters were read from Assistant Surgeons C. Joynt and A. M. Blomfield, requesting to continue Members of the Society. From Drs. Scott, Waller, Keith, and McDowall, regarding their subscriptions. From Superintending Surgeon White and from Assistant Surgeon M. M. Mackenzie intimating their withdrawal from the Society, and forwarding their subscriptions for the past year.

Members elected under Regulation VII. :— G. Morton, Esq., and F. H. Smith, Esq., Assistant Surgeons H. M.'s Bombay Army.

The following books were presented by the Director-General Medical Department :—"The Indian Administration Reports for 1856-57," in 3 volumes ; the "Mortality of the British Army," by the Sanitary Commissioners ; and "Institutes of Medicine," by Dr. Payne, and "Hints to Craniographers, &c.," by Dr. Meigs, presented by their Authors.

A tray of calculi, arranged by Mr. Carter, was laid upon the table for the inspection of Members previous to being deposited in the Grant College Museum, at the request of the donor, Assistant Surgeon Bowie. This unique and valuable collection was made by Dr. Bowie, when Civil Surgeon at Hydrabad, at Ahmedabad, and elsewhere, and is accompanied by notes illustrative of the cases and practice pursued. Dr. Bowie, it appears, has operated in upwards of fifty instances with great success, and is deemed a skilful lithotomist.

The first paper brought before the meeting was on the Chemistry of Condy's Fluid, by Dr. Giraud. The author stated that, under the name of "*Condy's Patent Fluid*," a liquid has of late been very extensively employed in England as a deodorizer and disinfectant, that the highest testimonials of its efficiency have been afforded by physicians and surgeons of hospitals, by superintendents of prisons, and by practical chemists. A quantity of Condy's Fluid had been sent to India for trial and report, and was now being used in the larger hospitals, prisons, &c., of this Presidency, he believed, with remarkable success.

Although the composition of the patent fluid is stated to be well known in England, yet no information upon this head was forwarded to India, and hence the mode of its application had not been altogether understood by medical officers making use of it. Dr. Giraud found, however, on analysis, that it was a solution of *manganate of soda*. He remarked that all true deodorizing and disinfecting substances act by decomposing organic matters more rapidly and more completely than if these matters were left to spontaneous decomposition. After entering into the chemical theory of the compounds formed by decomposition,

the action of disinfectants in destroying its effects was explained as due to the great affinity of the hydrogen of the decomposing substance for the oxygen of the disinfectant presented to it; and in this way, chlorine, nitric acid, and chloride of zinc are supposed to act; hence the best disinfectant is a substance which contains the largest quantity of oxygen, as Condy's Fluid, which, on dilution with water, becomes a per-manganate containing seven equivalents of oxygen to two equivalents of manganese. The writer remarked that "the inventor of the patent fluid has given it the rather high-sounding title of '*nature's disinfectant*,' but not without reason; for there is no substance which destroys putrefactive emanations in a manner so closely resembling nature's process, as this does. Nature's *true* disinfectant is the allotropic form of oxygen, "*Ozone*." This substance, endowed with the high activity and intense powers of nascent oxygen, attacks all organic substances of unstable chemical constitution, and kindling within them the secret fire of eremacausis, reduces them to those more fixed and stable binary gases, which serve as food for the vegetable kingdom, and thus the same ultimate results are produced as if the decomposing matters were burnt in a furnace, being rendered thereby comparatively harmless." The correct mode of using the fluid was then explained, viz: to apply it to the decomposing substance itself from which the deleterious emanations arise, and it was shown that to hang up cloths, dipped in the dilute solution, in order to purify the air, was unsound in theory and must be useless in practice.

An interesting case of degeneration of the colon, by Dr. Lownds, Residency Surgeon, Rajpootana Agency, and also a case of excision of the knee-joint,* performed with success by Dr. Lownds, were then read.

Dr. Winchester drew the attention of the meeting to some observations made by him several years since, relative to a peculiar disease, resembling cow-pox, affecting camels in the province of *Lus*, in Scinde, already published in the Society's Transactions for 1840, but regarding which no further information, had been obtained. He had lately, however, met with a somewhat similar notice of pustular disease affecting cows and sheep in the neighbourhood of Bushire, as described in Appendix D, Vol. I, of the Transactions of the Literary Society of Bombay, 1813, and the object in introducing the subject to the meeting was to ascertain if any further observations had been made by medical officers in Scinde or Persia, to confirm or otherwise facts noticed so long ago as 1813 and 1839, which were not only curious in themselves, but were likely, if established, to operate favorably in spreading

* Published at p. xli, Appendix, Transactions Vol. IV.

true cow-pox or vaccination through the country. As far as related to Bushire and Bagdad, Drs. Campbell and Hyslop mentioned, that, during their long residence in the Persian Gulf, the circumstances had not been noticed by them; whilst it was stated by the Secretary that there were no observations bearing on the subject, that he was aware of, contributed by officers of the vaccination establishment in Scinde.*

An interesting pathological specimen of Aneurism, presented by Assistant Surgeon J. M. Mackenzie, of Mhow, to the Museum of the Grant Medical College, was shown to the meeting, and the description which accompanied it read by Dr. H. V. Carter.†

After the best thanks of the Society were accorded to the contributors, the meeting was adjourned to Saturday the 5th March 1859.

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No. 3.

## MONTHLY MEETING HELD 5TH MARCH 1859.

*Present :*

A. H. Leith, M. D., *President,* in the Chair.

H. J. Carter, Esq, and J. Peet, M. D., *Vice-Presidents.*

*Members* :—W. Arbuckle, M.D.; H. D. Glasse, Esq.; R. Woosnam, Esq.; R. D. Peele, Esq.; H. Giraud, M. D.; G. C. M. Birdwood, M. D.; H. V. Carter, M. D.; F. Goold, Esq.; and W. C. Coles, M. D., *Secretary.*

The proceedings of the last meeting were read and confirmed.

Letters were read from Drs. Batho, Crawford, Pirie, Rogers, and Crowdace, regarding the transmission of their subscriptions.

The Annual Report of the 1st European Regiment Fusiliers,‡ stationed at Mooltan, and of the 23rd Regiment N. I.,‡ whilst in the Persian Gulf, as well as selections from other Annual Reports of European and Native Troops were read, and several interesting medical points, as they arose, were discussed.

A paper was then brought forward on the more prevalent diseases observed among European Troops at Hydrabad, Sukkur, and Shikarpore, by Assistant Surgeon Simpson M. D. It appears that during the latter part of 1857 and beginning of 1858, the writer held, for a time, medical charge of European Troops at each of those stations, and he embraced the opportunity thus presented of contrasting the

* Dr. Winchester's paper is published at p. xi, Appendix Vol. IV.

† Published at p. vi, Appendix Vol. IV. ‡ Published at pp. 288 and 268, Vol. IV.

peculiarities exhibited in the more important diseases of Fever, Dysentery, and Hepatitis. The contribution was considered by the meeting to be an interesting record of very careful observations.*

The following cases were then read :—

1. Tapeworm, treated with the Tincture of Kamela and Koosoo, by Surgeon Thom, 15th Regt. N. I.

2. On a new plan of operating for Hare-lip, by Assistant Surgeon Rogers, Poona Irregular Horse.†

3. On Snake-bite, by Assistant Surgeon Barnett, 6th Regt. N. I.‡

4. On Pyœmia, by Assistant Surgeon Johnstone, Native Veteran Battalion.

5. On Abscess in the substance of the Heart, by Surgeon Maitland, Superintendent, Mahableshwur.

6. On Concussion followed by Encephalitis, by Assistant Surgeon Daubeny, Scinde Horse.

7. On an unusual form of Hepatitis, by Assistant Surgeon Plumptre, Sanitarium Poorundhur.

8. Extract from the Medical Journal of the troop-ship *Hope*, by Staff Surgeon Smith, M. D.

After the best thanks of the meeting had been accorded to the Director-General Medical Department, for transmitting the above-mentioned papers to the Society, the President announced that, agreeably to Regulation 27, there would be a recess of three months at this period of the year, and that the next meeting would take place on Saturday the 2nd July 1859.

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No. 4.

## MONTHLY MEETING HELD 2ND JULY 1859.

*Present :*

A. H. Leith, M.D., *President*, in the chair.

H. J. Carter, Esq., and J. Peet, M.D., *Vice-Presidents.*

*Members.*—C. Morehead, M.D.; J. W. Winchester, LL.D.; H. D. Glasse, Esq.; W. Campbell, M.D.; R. Haines, M.B.; W. G. Hunter, Esq.; G. C. M. Birdwood, M.D.; H. V. Carter, M.D.; and W. C. Coles, M.D., *Secretary.*

The proceedings of the last Meeting, held on the 5th March 1859, were read and confirmed.

* Published at p. 43, *ante.* † Published at p. xl, Appendix Vol. IV.

‡ Published at p. xxxvii, Appendix Vol. IV.

Letters were read from the Secretary to the Geographical Society Bombay, and from the Principal of the Grant Medical College, in acknowledgment of the receipt of the last number (Vol. IV.) of the Society's Transactions. From Assistant Surgeon H. O. Thorold, advising the remittance of his subscription. From Assistant Surgeon J. Cruickshank, M. D.; J. Kearney, Esq.; and R. Boxwell, M. D.; requesting to become ordinary subscribing members of the Society. These gentlemen were accordingly elected under Section V. of the Rules.

The following gentleman was elected member for two years under Regulation VII.:—Assistant Surgeon D. Simpson, M. D.

The Secretary announced that Volume IV. New Series of the Transactions had been distributed in the usual manner, and stated that about 40 pages of Volume V. of 1859 were already in type, and that it was anticipated the number would be issued from the Press by the 1st January 1860.

The first paper brought before the Meeting was the Annual Report of the 25th Regiment N. I. for the years 1857-58 and 1858-59 by Surgeon W. J. Stuart, presented by the Director-General Medical Department. This is an elaborate medical history of the regiment during nearly two years of active service with the Malwa and Central India Field Forces. Surgeon Stuart was fortunate to have been present with his regiment throughout the campaign from the time of the regiment leaving Poona on the 8th June 1857 until its return in March 1859. He describes with care and minuteness the varying health of the regiment, and its being attacked by cholera when *en route* to Mhow. He represents the men as suffering at times from scurvy, and all its attendant ills; and shows how the general health of the regiment was restored by good food, shelter, &c.

In the first year of its campaign (1857-58), the 25th Regiment was about 996 strong in officers and men. The excitement of war and constant marching reduced the ordinary sick list, so that whilst the average daily number of patients in hospital was, when in quarters in Guzerat in 1856-57, about 35, there were less than 20 patients, on an average, during 1857-58, when on field service. Twenty-four deaths occurred during the year;—14 from cholera on the line of march; 6 from gunshot and other wounds and injuries; and 4 from other causes. During the second year of its service, about 80 old and disabled soldiers were invalided, and 200 recruits joined the regiment. The average daily number of sick was reduced to below 18; and the mortality was small, being only 13 deaths, 9 of which were due to actual conflict with the enemy.

Dr. Stuart describes each form of disease and injury met with on service; states that injuries from grape, cannon, or round shot were comparatively unfrequent, owing to the inefficiency or early capture of the enemy's artillery, and that consequently there were but few capital operations performed on the field, the generality of wounds being gunshot or matchlock. He further expresses his views on the subjects of sunstroke and acclimatization; and makes several suggestions with respect to clothing, diet, &c., as well as the care of the sick and wounded in the field, and states distinctly his opinion that "for the conveyance of the sick and wounded the dooly surpasses every form of sick carriage."*

After the paper had been read, some discussion ensued on the question of acclimatization. Dr. Peet referred to the evidence upon this point given before the Royal Commission for the re-organisation of the Indian Army. He thought this evidence meagre, and quite insufficient to establish the position taken up, that there is no such thing as acclimatization. Races undoubtedly do become acclimatized, of which there are examples in the Parsee and Mussulman communities of this country, and it is fair to suppose that a process of acclimatization exists during the lifetime of an individual. The greater mortality during the first year of residence as compared with the succeeding years was admitted before the Committee, but Dr. Peet thought the explanation given of this was erroneous. That after the first year there is a progressively increasing mortality during each year of service cannot perhaps be denied, but this may be due to removable causes, such as malaria, defective barrack-accommodation, &c., and that consequently it was no proof that the system might not, even during this later period, be gradually adapting itself to the climate.

Dr. Morehead viewed the ordinary initiatory fever, which frequently prevailed in newly arrived regiments, as a species of "acclimatization," and alluded to some instances which had come under his own observation whilst Superintending Surgeon of the Poona Division. Bearing upon the subject of the health of European troops, and their proclivity to disease, as well as the effects of elevated temperature in inducing apoplexy, or sunstroke, reference was made to a recent instance of very sudden mortality amongst the men of the K Battery Royal Artillery at Baroda, 10 of whom died between the 27th of May and the 2nd of June, apparently from no very assignable cause, but all with head symptoms, and in the course of a few hours; whilst a detachment of H.M.'s 4th (King's Own) Regiment at the same station only lost one man. So great was the alarm that measures were immediately taken to

* These reports are published at pp. 1 and 10, *ante*.

remove the Battery to Dubka, a distance of twenty-five miles, by which means apparently the disease was arrested, and the men were returned in comparatively good health and spirits. It is worthy of note that the more temperate men of the Battery did not suffer in the same proportion as those who resorted freely to the canteen, and that several of those who died were recorded as "hard drinkers."*

The reports on the recent epidemic of cholera were postponed to the next meeting, and in their place some notes on Zanzibar, by Captain Rigby, to the address of the President, were read.

Captain Rigby, states that very erroneous ideas prevail with respect to the climatology of Zanzibar, and that as far as his experience goes, and from all he can learn on the spot, the description published in 1850 is not correct. It is stated that the climate is inimical to Europeans; but Captain Rigby points to the French, German, and American residents of Zanzibar, who do not appear in the least to suffer from the climate. It is true that there are occasionally visitations of epidemic disease, and lately cholera appeared after an interval of twenty-five years, and carried off, during last December and January, from 100 to 200 persons daily, but it was chiefly confined to the Negroes, and inhabitants of the Corro Isles, and no instance occurred amongst the better class of Arabs or Europeans. There are two rainy seasons at Zanzibar when fever in a mild form prevails, and in certain districts of the island it is fatal to sleep out of doors. The chief peculiarity of the climate is the excessive moisture, as, besides the two rainy seasons, frequent showers occur every month in the year. There is no very cold weather, nor any season so hot as the months of April and May in Bombay, the mornings and evenings are always cool and agreeable, requiring extra clothing to be worn. There can be no doubt that, owing to the dampness and small range of the thermometer, the climate is enervating to Europeans, but those who can take a change every three or four years usually retain good health. Upwards of one hundred ships annually visit Zanzibar, and many remain four or six months without any injury to the health of their crews. The port is rapidly becoming the emporium of all Eastern Africa, and already furnishes to America and Europe their chief supply of copal, ivory, and cloves.

Dr. Birdwood laid on the table a number of the Ethnographical heads, from the Brothers Schlagintweits' collections. The casts have been prepared by the novel and highly effective galvano-plastic process, and are chiefly of the tribes of the Himalaya plateaux. They form but the first instalment of upwards of two hundred ordered by Government for the Central Museum. It was observed that it was unfor-

* Published at p. ix, Appendix, *ante*.

tunate that the casts only represented the faces of the individuals from whom they were taken, as it will be impossible to compute from them the facial angle and the parietal and occipito-frontal diameters of the heads of the varieties of the human race they illustrate.

After the best thanks of the meeting had been accorded to the contributors, it was adjourned to Saturday the 6th August.

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No. 5.

## MONTHLY MEETING HELD 6TH AUGUST 1859.

*Present :*

A. H. Leith, M.D., *President*, in the chair.

H. J. Carter, Esq., F.R.S., and J. Peet, M.D., *Vice Presidents.*

*Members.*—H. Miller, M.D.; H. D. Glasse, Esq.; W. Campbell, M.D.; C. C. Mead, Esq.; R. Haines, M.B.; W. G. Hunter, Esq.; H. V. Carter, M.D.; J. Davies, Esq.; and W. C. Coles, M.D., *Secretary.*

The proceedings of the last Meeting, held on the 2nd July, were confirmed.

Letters were read, acknowledging the receipt of the last volume of the Society's Transactions, from the Secretaries to the Director-Generals Madras and Calcutta; from the Principals of the Medical Colleges Calcutta, Madras, and Bombay; from the Bombay Mechanics' Institution; from Superintending Surgeon B. White; from E. Waring, M.D., Trevandrum; from Dr. Stratton, Baroda; from Assistant Surgeon R. C. McConnell, I. N.; and from Surgeon Batho, 26th Regiment N. I. Letters intimating the transmission of subscriptions were received from T. M. Lownds, M.D., and from E. F. Wheatley, Esq.

The books presented since last meeting were laid on the table, viz. "On the Hill Sanataria of Western India," by Mr. John Chesson, from the author;* "Deaths in Madras" during 1856, and "Papers relating to the History and Practice of Vaccination," drawn up by the General Board of Health, and presented by the Director-General Medical Department.

The following Gentlemen were elected members of the Society for two years, under Regulation VII., on admission into the Service, viz. Assistant Surgeons E. Sexton, M.D., W. Dymock, Esq., and J. Davies, Esq.

* Abridged with respect to Panchgunny, at p. xxv, Appendix, *ante.*

An interesting specimen of Hydatids of the Liver, forwarded by the Medical Officer of the Royal Artillery, Poona, for the Grant College Museum, was laid upon the table, and the case which accompanied, read.

The Annual Report of the 10th Regiment N. I., by Assistant Surgeon T. Murray, was read. This is a clear, concise, and valuable report of the health of the Regiment during the arduous campaign it underwent in Rajpootana, with Brigadier Smith's column, and in Central India, and will, with the report of the preceding year, probably be published in the next number of the Transactions.*

The 10th Regiment N. I. appears, from this report, to have been remarkably healthy. There were, out of a body of 971, only three deaths in hospital, seven sepoys were killed in action, and four died away from the Regiment. The average daily number of sick was about forty-seven. Dr. Murray says :—"The comparative exemption from sickness has been in some measure owing to the favorableness of the season, to the excitement of field service, to the success of the corps, and to the regular habits necessarily observed, rendering dissipation or irregularity incompatible with marching day after day."

From tables forwarded, the composition of the Regiment appears as follows :—

Mahrattas from the Southern Concan, about 47·5 per cent. ; other castes, including Brahmins, &c., about 22·5 per cent. ; Purwaries about 19·0 per cent. ; Mussulmen about 10·0 per cent. ; Jews and Christians about 1·0 per cent.

Their respective native countries were as follows :—

From the Southern Concan, about 47·5 per cent. ; from Hindoostan and the Punjaub, about 25·0 per cent. ; from Northern Concan and Deccan, about 21·5 per cent. ; from Madras, &c., about 6·0 per cent.

Their respective length of service was as follows :—

Less than 5 years' service, about 47·5 per cent.

Between { 5—10 years' service, about 6·5 per cent.
10—15 „ „ „ 15·0 do.
15—20 „ „ „ 25·0 do.

More than 20 years' service, about 6·0 per cent.

Dr. H. Vandyke Carter then read an interesting and elaborate paper upon the subject of vesical calculus founded upon an analysis of 119 calculi in the Grant College Museum. From Dr. Carter's investigations, it was apparent that oxalate of lime calculi are relatively more common in this than in European countries. Having compared the mortality after lithotomy in this country with that of some of the

* Published at p. 67, *ante*.

large hospitals in England, and in other parts in India, the size and number of the calculi removed, &c., the paper concluded with a summary of the deductions to which the author had been led by the investigations in which he had been engaged.

Dr. Carter's paper, it is anticipated, will appear in the forthcoming volume of the Transactions.*

Cases of some considerable interest, forwarded by Assistant Surgeon R. C. McConnell, were then read, viz., one of Hœmoptysis, caused by the accidental presence of a leech in the throat, and others on the treatment of mammary abscess by Belladonna, and of dysentery by large doses of Ipecacuanha.

After the best thanks of the Society had been accorded to the contributors, the Meeting was adjourned to Saturday, 3rd September next.

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No. 6.

## MONTHLY MEETING HELD 3RD SEPTEMBER 1859.

*Present :*

A. H. Leith, M.D., *President*, in the Chair.

H. J. Carter, Esq., F.R.S., and J. Peet, M.D., *Vice-Presidents*.

*Members.*—H. D. Glasse, Esq.; W. Campbell, M.D.; W. G. Hunter, Esq.; G. C. M. Birdwood, M.D.; C. J. F. McDowall, Esq.; H. V. Carter, M.D.; and W. C. Coles, M.D., *Secretary*.

The proceedings of the last meeting, held on the 6th August, were read and confirmed.

Letters were read from several gentlemen acknowledging the receipt of the Transactions. The 11th volume of the Transactions of the Geographical Society, presented by the Society, was laid on the table.

The following gentleman was elected an ordinary member of the Society for two years, under Regulation VII. :—H. J. Blanc, M.D., Assistant Surgeon.

Dr. Leith placed upon the table some morbid specimens under transfer to the Grant College Museum.

The Annual Report of the European General Hospital for the year 1858-59 was then read. At the commencement of the official year there were 120 patients in the hospital, and during the year the number of persons admitted was 1,927, or a total of 2,047 patients received treatment within its walls; that is, on an average, the number of sick

* Published at p. 140, *ante*.

daily under treatment was 101·4, notwithstanding the temporary transfer of a portion of the sick elsewhere,—a procedure undertaken to relieve the overcrowded state of the sick, and to permit of an additional upper ward to the hospital being commenced.

There were 93 deaths, being in the proportion of 4·5 per cent. to treated. Dysentery (acute and chronic) numbered 29; phthisis 11; diseases of the liver 8; small-pox 7; apoplexy 7; remittent fever 5; delirium tremens 2.

The Report embraces the medical history of the several diseases, their pathology and treatment, and will probably appear in the next volume of the Transactions.* An animated discussion ensued on several points contained in the report. Diagrams to facilitate the record of the state of the pupil in certain diseases were shown and distributed.

The half yearly and annual report of the Gizree, Aboo, and Poorundhur Sanataria were submitted to the meeting.

A further contribution to the natural history of Scinde Snakes, by Mr. Assistant Apothecary Vincent DeSouza, in temporary medical charge of the station of Meerpoor, was read. This is a very creditable production, considering the limited opportunities the writer had, and, as stated by the Superintending Surgeon, Scinde, "the report evinces industry and sagacity, although experimental investigation and scientific precision might have made it more valuable."

After the best thanks of the Society had been accorded to the contributors, the meeting was adjourned to Saturday the 1st October next.

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## No. 7.

## MONTHLY MEETING HELD 1ST OCTOBER 1859.

*Present:*

H. J. Carter, Esq., F.R.S., *Vice-President*, in the Chair.

J. Peet, M.D., *Vice-President*.

*Members.*—J. W. Winchester, LL.D.; R. Haines, M.B.; J. Pinkerton, M.D.; R. Boxwell, M.D.; and W. C. Coles, M.D., *Secretary*.

The proceedings of the last meeting, held on the 3rd September, were read and confirmed.

Letters were read from several subscribers on the business of the Society.

* Published at page 89, *ante*.

The books and pamphlets presented since last meeting were placed on the table ; amongst the latter were the *Dublin Quarterly Journal of Medicine*, regularly reeeived, and the several numbers of the *Indian Lancet* which have been published, and which are understood to be sent in exchange for the Society's Transactions.

The paper before the meeting, viz. " Notes on the Climate of the Plains, and of the Hill Country of Beloochistan, with a summary of the Meteorological Register for the months of May, June, July, and August," by H. Cook, M.D., Khelat Agency, was then read.

This is a very interesting and valuable contribution to meteorology, but as it will appear in the forthcoming volume of the Society's Transactions, a brief notice only is now given.*

Dr. Cook describes successively the climate of *Bhag* and *Dadhur* in the plains of the Bolan Pass ; and of *Quetta*, *Mustong*, and *Khelat* in the hill country. The mission was at *Bhag* during the first week in May, at the height of the hot season. The mean temperature of the 24 hours was 100°, and the excessive dryness of the air was shown by a difference of 35° between the dry and wet bulbs of the thermometer, as well as by the impossibility of obtaining a dew point. At *Dadhur*, the extreme heat was less than at *Bhag*, and the mean temperature of the 24 hours was less by about 4°, but no dew point could be obtained, although the temperature of the bulb was reduced to 54° of Fahrenheit. There was neither rain nor dew, but a furious dust-storm occurred. The climate of the Bolan Pass, Dr. Cook states to have given in his sketch of the Geology of Beloochistan.

The climate of the table-land of Beloochistan, Dr. Cook minutely describes, and gives an interesting account of the atmospheric phenomena observed, particularly of those phenomena which are intimately related to electricity, and are seen as *atmospheric dust*, *dust columns*, and *dust storms*. The author pursues his researches into those extraordinary phenomena, and arrives at the conclusion that they are dependent on atmospherical electricity or electro-magnetism, and in this view all must coincide who follow the masterly description given of them. Dr. Cook then alludes to the *simoon* or *poisonous wind*, which occasionally visits the deserts of Cutchee and Upper Scinde in common with similarly constituted tracts of country in the East, and thus deseribes the *simoon*, as " sudden and singularly fatal in its oeeurrence ; invisible, intangible, and mysterious, it has ever been the dread of the desert traveller. Its nature alike unknown (as far as I am aware) to the wild untutored inhabitant of the country it frequents, as to the European man of

* Published at p. 113, *ante*.

science, its effects only are visible, its presence made manifest in the sudden extinction of life whether animal or vegetable, over which its influence has extended, like the deadly stroke of that angel's wings who smote of old the Assyrian hosts."

The author then endeavours to trace the *simoon* to natural causes, and, by a process of able analysis and careful deduction, concludes that the poisonous wind is due to *ozone* having accumulated to a dangerous extent in the atmosphere, and to the impossibility of its being abstracted in the ordinary manner.

Dr. Cook states: "I do not pretend to have *solved* the difficult question; but if I have been able to throw any light on the intricate problem, or even to call the attention of others—far better fitted to accomplish such a task than myself—to the subject, I shall not have mooted the question entirely in vain."

Some points in the paper were discussed by the meeting, and, after the best thanks of the Society had been accorded to Dr. Cook for his valuable and interesting contribution, the meeting was adjourned to Saturday the 5th November 1859.

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No. 8.

## MONTHLY MEETING HELD 5TH NOVEMBER 1859.

*Present:*

A. H. Leith, M.D., *President*, in the chair.

H. J. Carter, Esq., F.R.S., and J. Peet, M.D., *Vice-Presidents.*

*Members.*—H. D. Glasse, Esq.; R. Haines, M.B.; W. G. Hunter, Esq.; H. V. Carter, M.D.; and W. C. Coles, M.D., *Secretary.*

The proceedings of the last Meeting, held on the 1st October, were read and confirmed.

The books presented since the last Meeting were laid upon the table, viz.—Deaths in Bombay for 1848, presented by the Director-General Medical Department; Two numbers of the *Indian Lancet* (Nos. 5 and 6), from the Editor; a pamphlet entitled "The past history and present condition of the Hyderabad (Deccan) Medical Schools," by Dr. G. Smith, Residency Surgeon, and Superintendent.

Agreeably to Section VII. of the Regulations, Assistant Surgeon D. McCosh was elected a Member of the Society, for two years, on joining the Service.

The President laid before the Meeting an interesting and rare pathological specimen of disease of the liver, supposed to be of tubercular deposit.

Dr. H. Vandyke Carter showed a recent and a dry preparation of obstruction of the femoral artery, and detailed the history of the former case,* the latter having been already recorded in the Society's Transactions, Vol. III., p. 25, Appendix.

Dr. Carter also exhibited some recent contributions to the Grant College Museum, and amongst them a calculus of large size, lately removed by Dr. James, Civil Surgeon, Dhoolia.

The examination of these pathological specimens occupied some considerable time.

Portions of the Annual Reports of the Head Quarters, Left Wing, and Depôt of the 1st Fusiliers were then read, drawn up by Surgeons Costelloe and Grierson, and Assistant Surgeon Straker; but as the reports themselves will probably be hereafter published, they are only now briefly alluded to.†

The average strength of the Head Quarters of the Fusiliers at Mooltan, during the official year 1858-59, was 474; the number of admissions into hospital 1397, and deaths 12, viz. 3 from remittent fever, 1 from chronic hepatitis, 1 from chronic dysentery, 1 from acute dysentery, 4 from apoplexy, and 2 from delirium tremens.

The average strength of the Left Wing at Umritsur was 385; the number admitted into Hospital 419, and deaths 10, viz. 2 from acute hepatitis, 7 from acute dysentery, and 1 from delirium tremens.

The Depôt of the Regiment at Kurrachee, consisting of weakly and unhealthy men left behind, or sent down from the Punjaub, numbered about 103, of which there were 334 admissions into hospital, and 3 deaths, the average daily sick during the year being 10. The Medical officer states: "From these facts, it follows that the proportion of sick to strength per cent. is 324·2 of deaths to strength 2·89, of deaths to treated 0·89, and that the relation of mortality to strength is not excessive, and in regard to sickness, small. Nine men were invalided from the depôt. With respect to those men who proceeded on sick leave, in number 21, or who were transferred, in number 66, they were almost entirely men who came from Head Quarters, and passed through the depôt hospital on their way to their destination. The exception to these were men of the depôt, who were sent some to Ghizree and some to Poorundhur."

* See Appendix, p. xxii. *ante.*

† Published at p. 165, *ante.*

The strength of the women at the Depôt was 66, out of whom 44 were treated in Hospital, and 1 died. The average strength of the children was 94, and the number treated in hospital 110, of whom 20 died. One-half of this large mortality was from measles, which appeared in an epidemic form, and attacked 52 children, 38 of whom were pure Europeans, and 10 died: whilst of 14 Indo-Europeans affected with the complaint, none died. The mortality was greatest in children under 3 years of age, being 1 to 3 attacked; next in those between 3 and 9 years of age, of which less than 1 in 5 died; and in those of 9 years of age, 10 were attacked but none died.

The reports from civil hospitals, announced in the prospectus of the meeting, were deferred till another opportunity.

A printed report, by Mr. Assistant Apothecary V. De Souza, on the treatment of snake-bites, and a communication relative to the treatment of leprosy, both received from the Commissioner of Scinde, were read.

After the best thanks of the Society were accorded to contributors of papers, the Meeting was adjourned to Saturday, 3rd December 1859.

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## No. 9.

## MONTHLY MEETING HELD 3RD DECEMBER 1859.

*Present:*

A. H. Leith, M.D., *President*, in the chair.

H. J. Carter, Esq., F.R.S., and J. Peet, M.D., *Vice-Presidents*.

*Members.*—J. W. Winchester, LL.D.; W. Campbell, M.D.; R. Haines, M.B.; G. R. Ballingall, M.D.; H. V. Carter, M.D.; and W. C. Coles, M.D., *Secretary*.

The minutes of the last meeting were read and confirmed.

A letter, dated Ayr, 5th October 1859, from W. Craig, Esq., M.D., was read, forwarding his recently published work on *Epidemics* for the acceptance of the Society, and requesting members would favour him with their observations thereon. The volume was directed to be acknowledged with the Society's best thanks, and to be circulated to the Committee. Two numbers of the *Indian Lancet*, received since the last meeting, were laid on the table. The Secretary placed on the table, for the inspection of members, four calculi forwarded by Assistant Surgeon Hewlett, Civil Surgeon, Bhooj, extracted from patients upon whom he had successfully performed the operation of lithotomy. One of these specimens was of unusually large size. A peculiarly shaped

calculus, lately extracted by Dr. Ballingall, was also shown, previous to being deposited in the Grant College Museum.

Dr. Peet then read "Selections from cases treated in the clinical wards of the Jamsetjee Jejeebhoy Hospital, of 'Pneumonia,' 'Bright's Disease of the Kidney,' 'Chronic Peritonitis,' &c.;" and with regard to each class of cases, made remarks on their symptoms, diagnosis, and treatment. This selection of cases will be published in the forthcoming volume of the Transactions.*

Some notes of a peculiar disease of the foot, affecting natives of Cutch and elsewhere, by Mr. Sub-Assistant Surgeon Bazunjee Rustomjee, presented by the Director General, were then read.†

After the best thanks of the Society had been accorded to the contributors of papers, the President announced that, on the 7th January, the annual meeting would be held for the election of office-bearers, &c.

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No. 10.

## ANNUAL MEETING HELD 7TH JANUARY 1860.

*Present :*

A. H. Leith, M.D.; H. D. Glasse, Esq.; H. J. Carter, Esq., F.R.S.; W. Campbell, M.D.; J. Peet, M.D.; W. C. Coles, M.D.; R. Haines, M.B.; G. R. Ballingall, M.D.; W. G. Hunter, Esq.; and G. C. Birdwood, M.D.

The Secretary read the following Report :—

*Annual Report.*

During the year 1859, eight ordinary Monthly Meetings of the Society have been held, and the attendance of Members has averaged about ten on each occasion. Eight Assistant Surgeons, on their first admission into the Service, have had their names added to our list as Members for two years. Two Subscribers have withdrawn during the year, and three new paying Members have joined, so that the number of Subscribers remains much as before. There have been about a dozen new works, chiefly pamphlets and ephemeral publications, presented to the Library, besides "*The Dublin Quarterly Review*" and "*The Indian Lancet*," which have been regularly received.

* Published at p. 189, *ante*.

† Published at p. 230, *ante*.

The last year has not been remarkable for the number of original contributions made to the Society. But amongst those deserving of chief notice are Dr. Vandyke Carter's "*Account of the Calculi in the Grant College Museum,*" Dr. Peet's "*Selection of Cases treated in the Jamsetjee Jejeebhoy Hospital,*" and Dr. Cook's "*Meteorology of a part of Beloochistan.*"

The Director-General of the Medical Department has continued the practice of forwarding to the Society Annual Reports and Cases of interest which come before him; and amongst those submitted to the notice of the Society during the past year have been the Annual Reports of the European General and Jamsetjee Jejeebhoy Hospitals, the Reports of the several local European Regiments, of some Native Regiments, Civil Hospitals, &c. Many of these papers will be found in the volume of the Transactions shortly about to be published.

At the last Annual Meeting it was stated to be a subject of regret that circumstances had delayed the publication of the volume of Transactions for the years 1857 and 1858, due at the close of the last-mentioned year. The 4th volume of the New Series, embracing that period, was, however, completed within a few months from the date of the last Annual Meeting, and was issued before June.

It has been proposed that the Society should, in assimilation to the practice of similar institutions elsewhere, publish a yearly volume of its Transactions, and the experiment will now shortly be made, to determine if there is matter of sufficient interest and importance brought before the Society between its Annual Meetings to authorise this course being adopted; and, if so, whether the Funds of the Society can support, without additional subscriptions, the publication of a yearly volume of its Transactions.

The chief feature which has marked the Meetings of the Society during the past year has been the exhibition of Morbid Specimens and other preparations. The Society is greatly indebted to the President for the several contributions he has afforded; to Dr. Vandyke Carter also for laying upon the table every specimen of interest procurable; and to Dr. Birdwood for his display of Ethnographical casts of heads, &c.

The Annual Accounts of the Society are now placed before you, and, according to the Rules, the Office-bearers of the past year resign the trust committed to them, and the present Meeting has to elect their successors.

*Annual Statement of Receipts and Disbursements of the Medical and Physical Society, from 1st January to 31st December* 1859 :—

| Receipts. | Amount. | | | Disbursements. | Amount. | | |
|---|---|---|---|---|---|---|---|
| | *Rs.* | *a.* | *p.* | | *Rs.* | *a.* | *p.* |
| Balance of last account closed on the 31st December 1858 ..... | 1,252 | 12 | 5 | Amount paid for printing Circulars, &c. ..... | 32 | 0 | 0 |
| Subscriptions received from 1st January to 31st December 1859 ..... | 1,200 | 0 | 0 | Office Establishment and Petty Charges, &c. .... | 247 | 4 | 6 |
| Amount received from Government for 100 Copies of Vol. IV. of the Transactions ..... ..... | 500 | 0 | 0 | Amount paid for printing 400 Copies of Vol. IV. New Series of the Transactions ..... | 1,018 | 0 | 0 |
| | | | | Balance in the Bombay Bank ..... | 1,655 | 7 | 11 |
| Rupees.. | 2,952 | 12 | 5 | Rupees.. | 2,952 | 12 | 5 |

The election of the Committee of Management for the year 1860 by the votes of all Members of the Society (who had recorded their votes) was declared. The following Gentlemen were found to be elected :— A. H. Leith, M.D. ; W. Arbuckle, M.D. ; H. J. Carter, Esq., F.R.S. ; J. Peet, M.D. ; H. Giraud, M.D. ; W. C. Coles, M.D. ; R. Haines, M.B. ; and G. R. Ballingall, M.D.

The election of Office-bearers then took place, when Dr. Leith was elected President, Mr. Carter and Dr. Peet, Vice-Presidents, and Dr. Coles, Secretary.

The examination of the accounts of the Society, and the submission of certain names of "medical men of celebrity not residing in India" as honorary members, agreeably to Regulation XII. (to be elected at the next Meeting), occupied the attention of the Society until its adjournment.

# REGULATIONS

OF THE

# MEDICAL AND PHYSICAL SOCIETY OF BOMBAY.

## ESTABLISHED 1835.

*Objects.*

I. The encouragement of the cultivation of Medical Science and its collateral branches, by discussion at periodical meetings, and by the publication of original communications.

*Constitution.*

II. The Society is composed of Ordinary, Corresponding, and Honorary Members.

*Ordinary Members.*

III. Under the head of Ordinary Members are to be classed all who contribute to the funds of the Society, and all who are admitted in accordance with Regulation VII.

IV. All Medical men residing in India, who can produce certificates of a regular medical education, are eligible as Ordinary Members.

V. Medical Officers of Her Majesty's Indian or British Services, are elected Ordinary Members of the Society, on application by letter addressed to the Secretary.

VI. Qualified Medical Practitioners, not belonging to Her Majesty's Indian or British Services, are elected by ballot at the ordinary meetings of the Society, and a majority of three-fourths of the Members present is necessary to secure the election.

VII. Assistant Surgeons, on first entering the Bombay Medical Service, are considered Ordinary Members of the Society, free of the payment of admission fee and annual subscription, and continue so for a period of two years, after which, should they not intimate their wish to be considered Ordinary Members by payment of the regulated admission fee and annual subscription, they are considered to have withdrawn from the Society.

*Payments.*

VIII. Ordinary Members pay an admission fee of Rs. 5, and an annual subscription of Rs. 12, payable in advance in the month of January of each year.

IX. Ordinary Members, absent from India, are not chargeable with subscriptions for the period of their absence.

X. Ordinary Members, neglecting to pay their annual subscription for two successive years, are considered to have withdrawn from the Society, and are liable to have their names erased from the list of Members, under a resolution passed to that effect at an ordinary meeting of the Society.

*Corresponding Members.*

XI. Ordinary Members, on retiring from service in India, on being proposed and seconded at an ordinary meeting of the Society, are eligible, by ballot, as Corresponding Members. A majority of four-fifths of the Members present is necessary to secure their election.

*Honorary Members.*

XII. Medical men of celebrity, not residing in India, are eligible as Honorary Members. On being proposed and seconded at an ordinary meeting of the Society, they may be elected at the next meeting by the unanimous consent of the Members present.

*Election of Office-bearers.*

XIII. The Committee of Management of the Society consists of eight Members, elected annually from among the Ordinary Members resident in Bombay, by the general vote of the Ordinary Members residing under the Government of Bombay.

XIV. The Voting Lists are circulated in the first week of November of each year, and the result of the election is declared at the annual meeting of the Society.

XV. In the event of vacancies occurring in the Committee between the periods of election, such vacancies to be filled up in rotation by the individuals who commanded the number of votes next to those of the Members returned at the last election.

XVI. A President and two Vice-Presidents of the Society are elected annually from among the Members of the Committee of Management, by the Members of the Society present at the meeting at which the annual election of the Committee is declared.

XVII. The Secretary of the Society is elected biennially from among the Ordinary Members resident in Bombay, at the annual meeting held in the month of January of alternate years, or, on the occurrence of a vacancy, at any other ordinary meeting of the Society.

*Committee of Management.*

XVIII. The Committee of Management have the general direction of the affairs of the Society, and decide on what communications are to be published in the Transactions of the Society. They keep minutes of all their proceedings,

which are entered into the Minute-book of the Society, and read at the following ordinary meeting.

XIX. When questions of importance to the stability and interests of the Society arise, they shall be submitted by the Committee for decision to the Ordinary Members residing *under the Government of Bombay*. The majority of votes necessary to decide any questions, to be determined according to its importance, and fixed at the time by the Committee.

XX. It shall form part of the duty of the Committee to give due consideration to all suggestions offered by Members of the Society.

*President and Vice-Presidents.*

XXI. The President shall take the Chair and conduct the business at all meetings of the Society.

XXII. In the absence of the President, one of the Vice-Presidents shall take the Chair, and conduct the business of the meeting; and in case neither be present, the senior Member at the meeting shall preside.

*Secretary.*

XXIII. The Secretary is a Member of the Committee of Management *ex-officio*.

XXIV. It shall be his duty to enter into the Minute-book of the Society minutes of the proceedings of all meetings and transactions of the Society, and, in communication with the Committee of Management, to conduct the details of business, and carry on the correspondence of the Society.

XXV. The Secretary shall prepare an annual statement of the receipts and disbursements of the Society, to be laid before the annual meeting in the month of January of each year.

XXVI. To enable the Secretary to perform these duties, a suitable establishment is entertained, under the sanction of the Committee of Management, confirmed at an ordinary meeting of the Society.

*Meetings.*

XXVII. Ordinary meetings of the Society are held in Bombay on the first Saturday of every month, except in April, May, and June.

XXVIII. The chair being taken, the order of business shall be as follows:—

1. The minutes of the last meeting, and those of subsequent Committee meetings, to be read and confirmed.
2. The announcement and election of new Members, in accordance with Regulations V., VI., and VII.
3. The election of Corresponding and Honorary Members.
4. The reading of letters, and the discussion of any ordinary business of the Society which may be before the meeting.
5. The announcement of presents and donations.
6. That of papers and dissertations received since the last meeting.

XXIX. After the announcement of the papers and dissertations, the President shall call upon the Secretary to read one or more of them, and shall subsequently

invite the Members to discuss any particular part of them which they may consider deserving of remark.

XXX. No new business shall be introduced until that which is before the meeting has been concluded.

*Papers and Dissertations.*

XXXI. All papers and dissertations presented to the Society to be considered the property of the Society.

XXXII. The Transactions of the Society are published by the Secretary, in communication with the Committee, as often as circumstances will admit.

XXXIII. A copy of each publication is presented to the Honorary and Corresponding Members of the Society, and to every Ordinary Member who, at the time of publication, is a contributor to the funds of the Society.

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*N. B.*—All communications addressed to the Secretary or Treasurers must be prepaid.

Members are requested to pay the amount of their subscriptions to the Bank of Bombay, Treasurers to the Society.

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☞ The publications of the Society are for sale by Messrs. Chesson and Woodhall, Booksellers, Bombay, the Society's Agents.

The First Series of the Transactions of the Society consist of—

| | | | | | |
|---|---|---|---|---|---|
| No. | 1, 1838..... | Pp. | 370 ..... | Rs. | 5 |
| ,, | 2, 1839..... | ,, | 269 ..... | ,, | 5 |
| ,, | 3, 1840..... | ,, | 225 ..... | ,, | 3 |
| ,, | 4, 1841..... | ,, | 156 ..... | ,, | 3 |
| ,, | 5, 1842..... | ,, | 196 ..... | ,, | 3 |
| ,, | 6, 1843..... | ,, | 250 ..... | ,, | 3 |
| ,, | 7, 1844..... | ,, | 206 ..... | ,, | 3 |
| ,, | 8, 1845-46 ..... | ,, | 122 ..... | ,, | 3 |
| ,, | 9, 1847-48 ..... | ,, | 264 ..... | ,, | 5 |
| ,, | 10, 1849-50 ..... | ,, | 338 ..... | ,, | 5 |
| The Index to the above ..... | | | | ,, | 1 |

The Second Series of the Transactions consist of—

| | | | | | |
|---|---|---|---|---|---|
| No. | 1, 1851-52 ..... | Pp. | 356 ..... | Rs. | 5 |
| ,, | 2, 1853-54 ..... | ,, | 362 ..... | ,, | 5 |
| ,, | 3, 1855-56 ..... | ,, | 389 ..... | ,, | 5 |
| ,, | 4, 1857-58 ..... | ,, | 389 ..... | ,, | 5 |
| ,, | 5, 1859 ..... | ,, | 349 ..... | ,, | 5 |

# MEDICAL AND PHYSICAL SOCIETY OF BOMBAY,

## FOR THE YEAR 1859.

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### Patrons.

The Director-General Medical Department.

The Deputy Inspector-General of Her Majesty's Hospitals, Bombay.

### President.

A. H. Leith, M.D.

### Vice-Presidents.

H. J. Carter, F.R.S. | J. Peet, M.D.

### Committee of Management.

The President, the Vice-Presidents, and the Secretary.

W. Arbuckle, M.D. | H. Giraud, M.D.
J. W. Winchester, LL.D. | G. R. Ballingall, M.D.

### Secretary.

W. C. Coles, M.D.

### Honorary Members.

C. J. B. Williams, M.D., F.R.S., &c., London.
Sir B. Brodie, D.C.L., F.R.S., &c., London.
R. Christison, M.D., F.R.S.E., Edinburgh.
W. P. Alison, M.D., F.R.S, Edinburgh.
J. Syme, Esq., F.R.S.E., Edinburgh.
J. W. Cusack, M.D., &c., Dublin.
J. Y. Simpson, M.D., Edinburgh.
Baron Liebig, M.D., of Munich.

### Corresponding Members.

*(Late of the Bombay Medical Service.)*

J. Burnes, K.H., F.R.S.
J. Don, M.D.
J. Glen, Esq.
A. Henderson, Esq.
H. Johnstone, Esq.
J. McLennan, M.D.
G. Smyttan, Esq.
J. Walker, Esq.

## Ordinary Members.

### I.—SUBSCRIBING MEMBERS.

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F. S. Arnott, M.D.,
H. Atkins, Esq.
J. Bain, Esq.
G. R. Ballingall, M.D.
J. M. Barnett, M.D.
J. E. Batho, Esq.
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T. B. Beatty, Esq.
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T. Crowdace, Esq.
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